

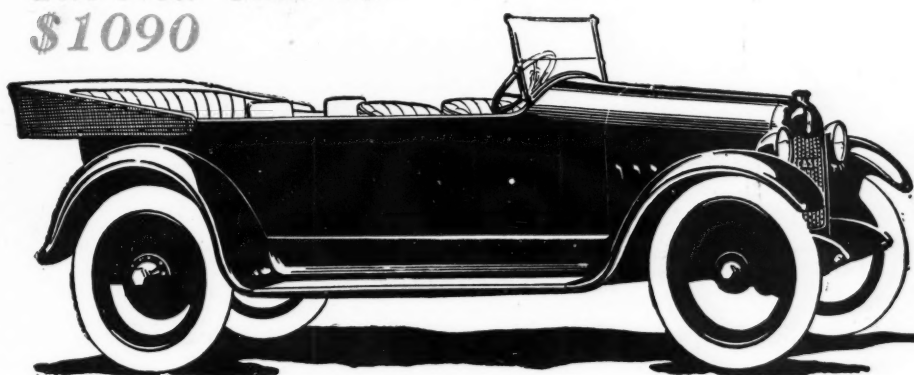
# MOTOR AGE

Vol. XXIX  
No. 11

CHICAGO, MARCH 16, 1916

Ten cents a copy  
Three dollars a year

*The New Case 40*  
**\$1090**



*“—the motor that makes extra  
cylinders unnecessary”*

So said an automobile expert after he had examined the new Case 40, both in the shop and out on the highway.

*Your customers* will say the same thing when they see it and test it in a hard pull or up a steep incline, or on the car's *100,000th mile*. We have built this car justly to be called the “100,000-Mile Car.”

The new Case 40, advanced in design and comforts, still retains those genuine qualities which gave the earlier Case 40 such a splendid reputation.

What *other* car has such a pedigree as this new Case 40? *Where* can you duplicate this certainty of satisfaction? Made by Case-trained workmen at the Case plants, the new Case 40 has behind it an honored reputation of nearly *four-score* years. One generation after another has recognized in Case *uncompromising* standards of excellence.

The new Case 40 is bound to add to Case fame and dealers' profits. As a selling proposition it is a strong asset to any dealer.

## *An Interesting Dealers' Proposition*

We shall be glad to explain fully to you our new proposition. We invite correspondence in relation to the establishment of new Case agencies. We still have a number of excellent opportunities. But since we have an excellent proposition, we are looking for exceptional dealers.



The Sign of  
Mechanical  
Excellence  
the  
World Over

J. I. CASE T. M. CO., Inc., 507 Liberty St., Racine, Wis.



The Sign of  
Mechanical  
Excellence  
the  
World Over

(399)



## **“Makes them pay Attention”**

Motorists right in your town have stopped fooling with poor horns and want the Stewart Warning Signal that “Makes them pay attention.” If you are not getting any of this business, it's your fault. This demand for Stewart Warning Signals means good profits for you. Sell them.

**\$3<sup>50</sup>**

---

***Stewart* Warning Signal**  
HAND-OPERATED

---

Stewart-Warner Speedometer Corporation, Chicago, U. S. A.





Published by the  
CLASS JOURNAL COMPANY  
910 South Michigan Avenue  
CHICAGO ILLINOIS

NEW YORK OFFICE, 239 West 39th Street

Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, Under Act of March 3, 1879—Member of the Audit Bureau of Circulations. Circulation Audited and Verified December 8, 1914—Copyright by the Class Journal Co., 1916.

United States, Mexico and U. S. Possessions.....One year \$3.00  
Canada.....One year \$5.00; All Other Countries in Postal Union....One year 6.00

BEWARE OF SUBSCRIPTION SOLICITORS OFFERING PREMIUMS OR CUT RATES—ALL CURRENCY SHOULD BE SENT BY REGISTERED MAIL.

SUBSCRIPTIONS received up to the 15th of the month begin with first issue of that month; those received later, start with first issue of following month.

RENEWALS or CHANGE OF ADDRESS should be sent two weeks in advance of date they are to go into effect. Be sure to send old as well as new address to avoid unnecessary delay. RECEIPT of first copy is acknowledgment of subscription.

Volume XXIX

March 16, 1916

No. 11

## Contents

PLAYING THE SEARCHLIGHT ON MOTOR CAR INSURANCE.....	5
General introduction to a series on the features of fire, theft, collision and liability policies	
PROHIBITS MANUFACTURE AND SALE OF DEMOUNTABLE RIMS...	12
Court issues injunction against Standard Welding	
OVERLAND FINANCIAL REPORT SHOWS GAIN.....	13
Earns over 45 per cent on common stock	
EDITORIAL .....	14
Garage organization—The spring battery—Speedway elimination races	
A. A. REVISES SCHEDULE OF OFFICIAL RECORDS.....	16
Non-competitive division created—Stock chassis rules and provision for 24-hour races	
MOTOR RESERVE CORPS JOIN FUNSTON'S FIGHTERS AT BORDER	18
Los Angeles battery under Motor Age correspondent called into action	
SIGNS .....	20
Some of the novelties in road and street markers	
LANE BLAMES REFINERS FOR GASOLINE COST.....	23
Congress heeds motorists' demand for light—Early action probable	
FORD IN FUEL FIGHT.....	24
Car maker may turn experts loose on Rittmann process	
NEWS OF THE SHOW CIRCUIT.....	25
Boston dealers want longer time for exhibition	
PLANS FOR S. A. E. SUMMER CRUISE COMPLETE.....	26
Include trip on Great Lakes and Georgian Bay	
AUGUSTA, GA., HALLOWED BY MEMORIES OF TWO WARS.....	27
City rich in historical associations	
RE-TEMPERING SPRINGS PREVENTS BREAKAGE.....	32
Majority of breakages can be avoided	
MOTOR CAR DEVELOPMENT.....	40
New Detroit Six, Rock Hill and four-drive tractor described and illustrated	
DEPARTMENTS	
Repair Shop.....	34
Readers' Clearing House.....	36
From the Four Winds.....	44
Among the Makers and Dealers	46
Accessory Corner.....	48
Index to Advertisements.....	132

### —NEXT WEEK—

Whether you have had your car in service all winter or have had it in dry dock during the cold weather, there are certain things that should be done to it in preparation for spring and summer driving. What these are and how they are done is told in an interesting way in the feature article of the issue of Motor Age for March 23—Also the latest reports of military motors on the Mexican border and the European trenches from our special war correspondents at the front.

## Moving to Larger Quarters

is in keeping with MOTOR AGE'S traditional policy of letting nothing stand in the way of serving its readers with the largest measure of interest.

MOTOR AGE, since its inception 16 years ago, has kept consistent step with the development and needs of the specialized class and the industry it serves.

New and larger quarters being necessary to effect certain imminent and far-reaching betterments—new and larger quarters were forthcoming.

AFTER APR. 1, ADDRESS

## Motor Age

MALLERS BUILDING

S. E. Cor. Wabash Ave. and  
Madison St.

CHICAGO, ILLINOIS

TELEPHONE: RANDOLPH 6960

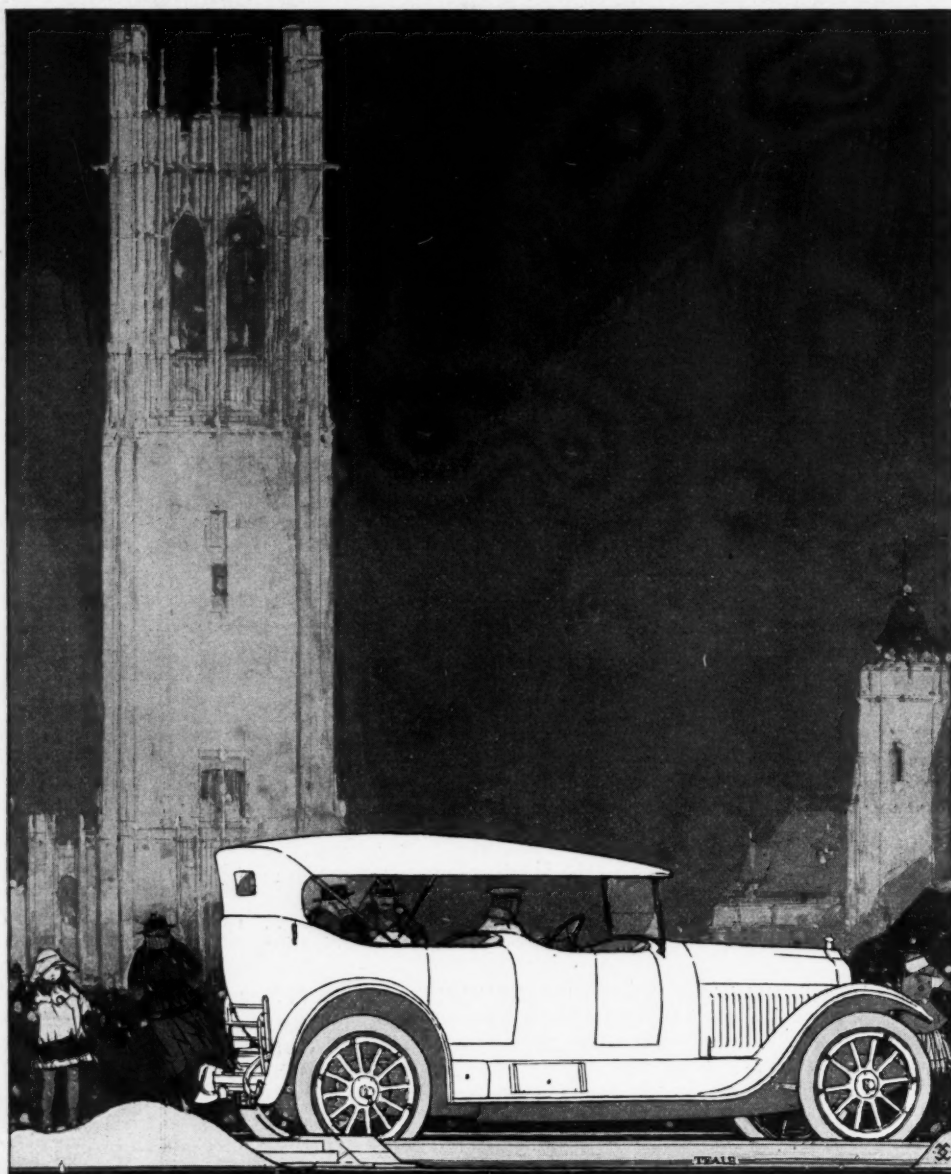


The New Home of  
MOTOR AGE  
and the Western Offices of  
THE CLASS JOURNAL CO.  
and its allied interests

THE AUTOMOBILE "MOTOR PRINT  
MOTOR WORLD" COMMERCIAL VEHICLE  
THE AUTOMOBILE BLUE BOOKS  
THE AUTOMOBILE TRADE DIRECTORY

Larger Quarters  
Central Location  
Increased Facilities  
Top (21st) Floor

MALLERS BUILDING—CHICAGO  
S.E. Corner Wabash Ave. and Madison St.



# White

## *Custom Built*



*A* high purchase price for a high quality car may give less bulk for the money, but it gives more satisfaction to the owner who appreciates a fine piece of mechanism and the lasting refinement of a custom-made body.

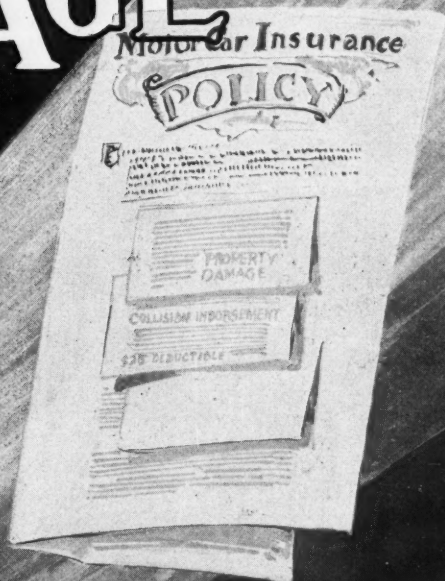
The price of White motor cars is stable, year after year, because their value is constant. There can be no reduction of the one without depreciation of the other. Neither the methods nor the results of quantity production apply in the manufacture of a White.

THE WHITE COMPANY

*Cleveland, Ohio*



# MOTOR AGE



## Playing the Searchlight on Motor Car Insurance

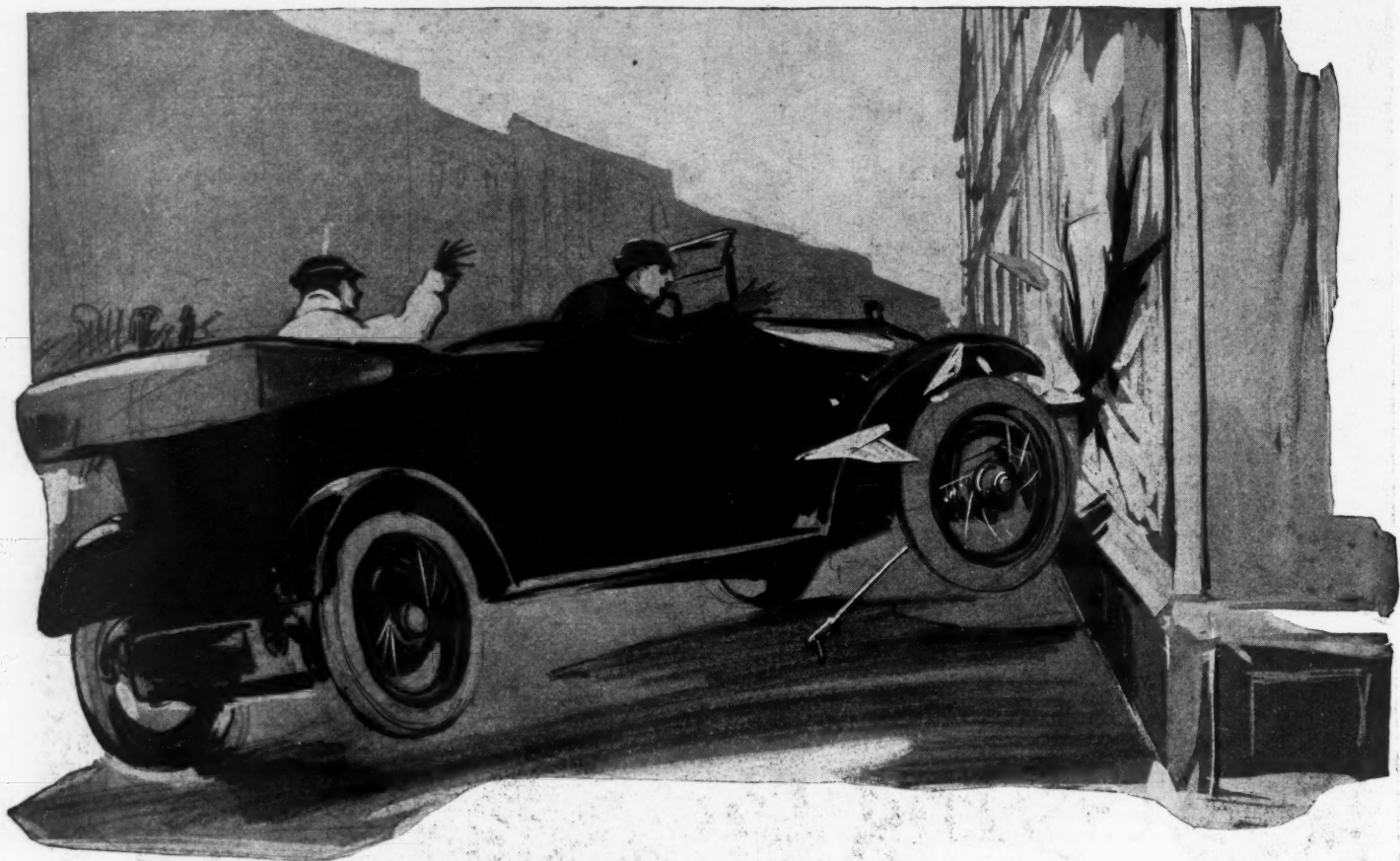
(By William K. Gibbs)

Editor's Note—On the following pages appears a general discussion of motor car insurance which serves as an introduction to a series of articles treating the subject more in detail. This series, which will begin next week, has been prepared especially for Motor Age by Robert Riegel, Instructor in Insurance, University of Pennsylvania.

JUST a minute, please! You have placed yourself back of the wheel of your new 1916 forty, waved the demonstrator away, the motor is purring gently, the clutch is thrown out and your control lever is in low. When you release the clutch pedal you will begin a journey, the dangers and difficulties of which you know little or nothing. Wouldn't it be worth your while to know that whatever happens just around the first turn, perhaps, or farther down the road, your investment and your purse are protected? Or, didn't you think much about the part of the road beyond the point you can see? If you did think about such contingencies you probably have fortified yourself behind an insurance policy that you were told would indemnify you for loss and damage, brought about through the operation of your car.

Assuming that you have in your safe or vault insurance policies covering you life, your house, its contents, or your motor car, do you know just what all the clauses, exceptions, rules, exceptions to the rules and the various riders mean, or do you just think you know? Were you so interested in reading, that "the — Insurance Co., in consideration of — dollars, does insure for a period of 1 year — in the amount of \$1,000," or more as the case may be, that you failed to read further than the first few paragraphs of the small print "conditions and stipulations" on the back of the policy?

If you did read every word of the policy, did you understand it? Were you not just about as much at sea when you finished as when you began? I venture to say you were and from here on I shall try



*If his car fancies a little window shopping, regardless of the influence of the driver, and should be so eager to view the contents of the show window that it forgets there is a glass in front of the display, then the property damage indorsement on the policy puts the onus of settlement for the damage on the company writing the insurance*

to tell you what your motor car insurance policy offers in the way of protection, what your rights are, what the exceptions are under which you forfeit your rights, in fact turn the searchlight of understanding on your policy and ferret from it just the facts, shorn of all useless words. If you have a car with no insurance on it, I hope that after you read what is to follow, you will see the value of protecting your pocket-book through the purchase of a policy.

#### **Two General Insurance Classes**

Motor car insurance is divided into two classes, but these have indorsements which really protect the insured in five ways. One policy covers loss of the car by fire or theft; the other is known as the liability policy. To either of these may be attached riders—one for insuring the car owner against damage done to the property of others, this rider being known as the property damage indorsement, and the other for insuring the car owner for damage to his own car. This is known as collision indorsement and there are two indorsements coming under this head. One is known as the "\$25 deductible indorsement," and the other, "full coverage."

Fire and theft insurance reimburses the policy holder for either complete or partial loss or damage to the car, its body, machinery and any equipment attached to and forming a part of the car. It does not cover robes, coats and other wearing apparel left in the car, unless indorsement is made on the policy, at the time it is written, covering such articles. The policy

holds good within the limits of the United States, except Alaska and the island possessions, and also is good in the Dominion of Canada. It protects the policy holder against loss or damage to the machine while in transit on railroad cars, ferries, inland steamers, or on coastwise steamers between ports within the limits mentioned, or while the car is in the street, on the road or in any building.

From this it will be seen that one is given a wide latitude of travel without invalidating his policy. It also gives him permission to leave his car or garage it wherever he chooses. Fire losses from any cause, including explosion, self-ignition and lightning, are guarded against by this policy and also all losses, if amounting to \$25 on each occasion, by theft or robbery by persons other than those employed by the policy holder. Of course, if the car itself is stolen, the full amount is paid.

That there are exceptions to all cases never was more truly exemplified than in insurance policies. That is why the policy holder should take a day off and read the stipulations and conditions of his policy that usually are printed in such small type as to make the insured chary of beginning the task. If he attempts to read and gets much out of the first trial he must necessarily go slow and parse each sentence and clause, using great care to get the qualifying phrases properly placed. Chances are that he will get more than one meaning to some of the sentences and he will never know he chose the wrong one

until his construction and that of the company underwriting the insurance take issue.

I will tell you as briefly as possible some of the conditions under which you cannot collect on your policy. Here they are:

#### **A Few of the Exceptions**

If you now have, or hereafter take out a similar policy with another company, unless written permission is given.

If you carry passengers for compensation. Of course, taxicab companies get protection, but under another form of policy and at a higher rate. The point is you cannot insure as a private passenger car and then put in the passenger-carrying business for compensation.

If you rent or lease your car.

If you assign your interest in the car, either all or in part, without written consent of the company. Policies may be transferred when the car is sold, but unless the company consents, the insurance is invalidated.

If your interest be other than unconditional and sole ownership.

If your car is or becomes encumbered by a lien or mortgage.

If anyone has assumed any insurance risk prior to the obtaining of your policy. This is considered previous insurance.

Among other things that the policyholder must do in order to recover on his fire and theft policy, is to notify the company immediately in writing of any loss, protect the property from further damage if occasioned by fire, separate the damaged from the undamaged property and make an



Class	A		B		C		D		E	
	(Insure for not to exceed actual cost or less than 50 per cent)									
New .....	\$1.50*	\$1.00†	\$1.75	\$1.25	\$2.00	\$1.25	\$2.25	\$1.25	\$2.75	\$1.25
One year.....	Option of company		80 per cent		Insure for not more than 70 per cent		60 per cent		Option of company	
	\$1.75	\$1.25	\$2.00	\$1.50	\$2.25	\$1.50	\$2.50	\$1.50	\$3.00	\$1.50
Two years....	Option of company		60 per cent		Insure for not more than 50 per cent		40 per cent		Option of company	
	\$2.25	\$1.75	\$2.75	\$2.25	\$3.00	\$2.25	\$3.50	\$2.50	\$4.00	\$2.50
Three years..	Option of company		40 per cent		Insure for not more than 30 per cent		20 per cent		Option of company	
	\$3.00	\$2.50	\$4.00	\$3.50	\$4.75	\$4.00	\$5.50	\$4.50	\$6.00	\$4.50
*Fire and theft combined.										
†Fire only.										

\*Fire and theft combined.

†Fire only.

inventory, stating the cost of each article listed and the amount claimed therefor. Sometimes it is requested that the policy holder make a sworn statement as to the truthfulness of the list submitted.

The company's liability does not extend beyond the actual cash value of the car at the time of the loss or damage, with proper deduction for depreciation, and in no case is its liability to exceed what it would cost to repair or replace with parts or materials of the same kind and quality. The company reserves the option of taking all or any part of the car and to repair or replace, by giving 30 days' notice after proof of loss is received.

Fire and theft insurance which covers the car anywhere in the United States or Canada is issued under the name of "floater policies." Floater policies carry a higher premium than those covering a car that is to be kept in one place for a long time. In the latter case the risk is not so great.

Different districts have different rates for fire and theft insurance, governed mostly by the hazard, although there is less variation in the fire and theft premium rates in different parts of the country than in the other classes of insurance. All of the important insurance companies are members of an association which fixes the rates, so that the premiums and the regulations are the same for all of them. In fact, the policies for one class of insurance read almost identical and the premium rates for the same car and the same kind of insurance are the same for all the underwriters in the association.

#### Companies in Conference

This association is known as the Automobile Underwriters' Conference, and comprises between thirty-five and forty companies. The more common fire and theft policy is called the "conference form" and is used by all the underwriters in the conference. The conference is divided into six districts. Rates are somewhat different in each, but those applying in the district of which Chicago is the center are typical.

Premium rates for insuring gasoline passenger cars are based on the manufacturers' original prices as shown in book of list prices furnished by the company. All cars listing at \$3,500 or over come under class A, those listing at from \$2,100 to \$3,499 under class B; \$1,200 to \$2,099, class C; \$700 to \$1,199, class D, and those at \$699 and under, class E.

New cars are insurable for not to exceed their actual cost, nor less than 50

per cent of their original list price. As the car becomes older the amount for which it may be insured is arrived at by a graduated percentage scale, except cars coming under class A and class E. When cars coming in these classes are 1, 2, 3 or more years old the company reserves its right to say how much insurance it will write on them, but the rate basis is fixed. Above is a table showing rates for fire and theft combined, and also for fire only.

Older models in class A are insurable for an amount to be determined by the company at \$3.50 per hundred dollars of insurance for both fire and theft and \$3 for fire alone.

#### Rates on Electrics

Electric cars of all models are insurable at \$1.25 for each \$100 represented by the policy. The amount of insurance to be written is at the discretion of the company, but the minimum premium is \$10 a year. Rates on dealers' cars are about 1 per cent higher than those just quoted and on dealers' second-hand cars, 1 per cent higher than on new cars. Livery and renting cars are about 1 per cent higher.

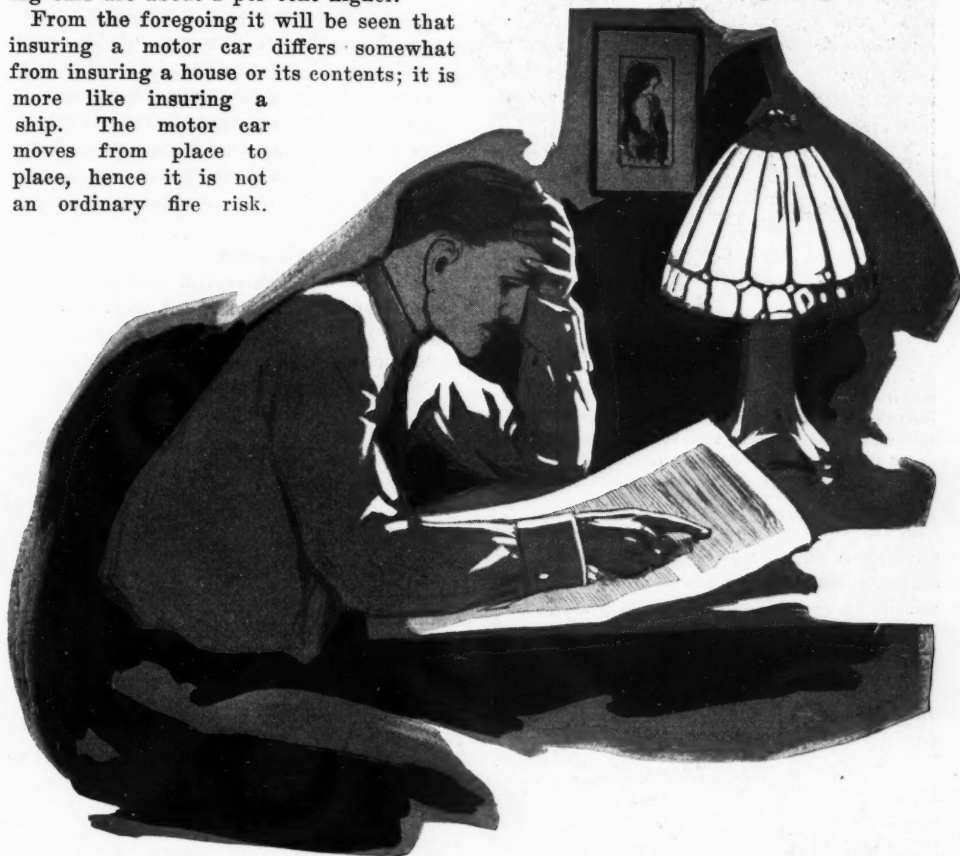
From the foregoing it will be seen that insuring a motor car differs somewhat from insuring a house or its contents; it is more like insuring a ship. The motor car moves from place to place, hence it is not an ordinary fire risk.

Further, it will be noted that an owner cannot insure his car for any amount he wishes, or may think it is worth, particularly for fire and theft. The underwriters have set certain limits beyond which the car owner cannot get insurance. Like persons the older they become, the higher the rate of insurance, although with fire and theft the amount for which the car is insurable revises downward as the age goes up. After the third year of service cars are insurable only when the agent personally knows the owner and the history of the car.

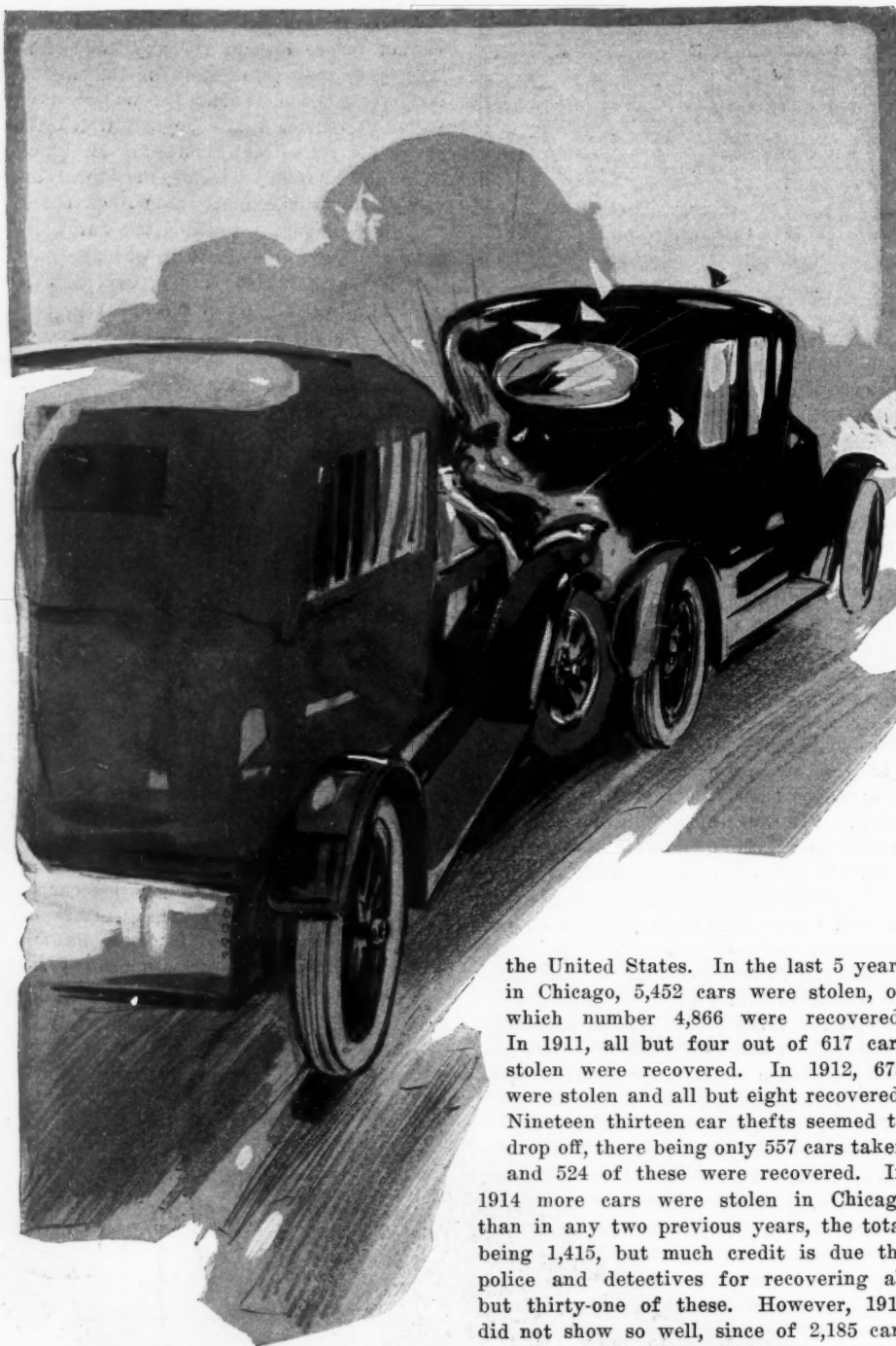
#### Factors in Determining Premium

In figuring the premium to be paid it is well to know that additional equipment or additional bodies do not take the car out of the classification indicated by the list price. Whenever the list price is for chassis only, which is rare in the American market, the value of the body must be added to establish the list price for the purpose of determining the rate. All of the fire and theft policies permit of a reduction of 15 per cent from the rates for carrying approved fire extinguishers at all times during the life of the policy.

When it is taken into consideration that so many hundreds of cars are insured each year, without anyone from the underwriters seeing the car or knowing the owner, the question naturally presents itself, "How can the companies afford to take the risk of a man disposing of his car to his own advantage and claiming insurance under the theft clause?" There is nothing to prevent this, but there is a penalty for it and also a very diligent police and



Should take a day off and read the stipulations and conditions of his policy that usually are printed in such small type as to make the insured chary of beginning the task



*The driver of the car ahead of you may make a quick stop, while you plow serenely halfway through the tonneau of his machine. Of course, he expects you to pay, but you can wave your property damage indorsement under his nose and tell him to see your lawyer*

checking system whereby such methods are dangerous ones to pursue. Frequently insurance companies replace one's car with another like it, that is, the same make and model, paying a lower price than the policy-holder paid because the new models are out. If a car is replaced it is with an unused one usually, or one equally as good.

Car stealing has gained impetus every year. Recoveries are made in a large majority of thefts, but as the thefts increase the ratio of loss increases. Figures for Chicago are interesting. Here car-thieves probably are as active as in any part of

the United States. In the last 5 years in Chicago, 5,452 cars were stolen, of which number 4,866 were recovered. In 1911, all but four out of 617 cars stolen were recovered. In 1912, 678 were stolen and all but eight recovered. Nineteen thirteen car thefts seemed to drop off, there being only 557 cars taken and 524 of these were recovered. In 1914 more cars were stolen in Chicago than in any two previous years, the total being 1,415, but much credit is due the police and detectives for recovering all but thirty-one of these. However, 1915 did not show so well, since of 2,185 cars stolen, and 410 are yet to be accounted for.

#### Bureau Recovers Cars

Most of the companies writing motor car insurance are members of the Automobile Protective and Information Bureau, which makes a business of recovering stolen cars. Each week a list of the cars stolen is printed and sent to all police stations in Chicago and to garages and chiefs of police in nearby cities and states. A facsimile of one of these reports is shown elsewhere. Another card is printed for cars reported stolen in other parts of the country. These are sent to territory contiguous to the city from which the car was stolen. The success of this institution is best told by the results obtained, but space does not permit of going into that detail at this time.

While the cars recovered show well, it does not follow that the thief is punished;

in fact, a very small percentage are caught or convicted. The following table tells its own story. It is for 1915 in Chicago, when 2,185 cars were stolen and 1,775 recovered.

Arrests .....	90
Fined .....	9
Held to criminal court.....	46
Sentenced to house of correction.....	5
Sentenced to penitentiary.....	13
Fugitives returned to Chicago.....	30
Value of property recovered.....	\$115,225

There are certain temptations to the car owner in the theft clause if he is not over-scrupulous. He sees where he may dispose of his car to someone and collect from the insurance company. Were it not that these fraudulent claims have become such a factor in increasing the moral hazard of writing insurance, honest motorists would not be obliged to pay so much premium by 15 per cent. All are penalized 15 per cent to make up for dishonest practices by those who would make fraud their vocation.

And now just another word before passing on another class of insurance. Suppose your car is stolen. You wait a reasonable length of time for its recovery. The insurance company pays the claim, and later the car is found. You do not have to take the car and return the company the money it has paid you. You are safe in buying another car with the money realized from your policy.

#### Liability or Asset?

I remember of covering a bankruptcy case in Judge Kenesaw Mountain Landis' court at Chicago, and during the course of the hearing the judge asked the bankrupt what resources he had. The man replied that he had two motor cars.

"I guess you didn't understand me; I said 'resources,'" Judge Landis remarked, and he didn't smile, either.

I do not believe the average man who buys his first car properly appreciates the liability he is taking upon his shoulders. Accidents will happen and sometimes, even though he is blameless, suit may be brought and a jury may convict. What a relief to know that no matter what mix-up one gets into with his car, someone else will bear the burden, and by this I do not mean mix-ups as the result of recklessness. If a man is careless and injures someone, perhaps fatally, no one can bear his burden. He may avoid the law, but his conscience pays just the same.

Deleting the personal injury element from driving hazard, there are many instances every day where damage is done to the property of others that make one amenable to the law and often makes the person responsible, therefor the subject of suit for damages. It goes without saying that it often is all one can do to maintain his own car without paying a heavy damage suit for something he does with his car to the property of others. This can be taken care of for him if he is willing to pay a reasonable insurance premium.

Liability insurance protects the policy holder against claims for damages on account of bodily injuries, including death resulting therefrom, due to ownership,



maintenance or use of a motor car, anywhere in the United States or Canada, to the extent of \$5,000 for one person and up to \$10,000 for two or more. Policies written in the United States do not apply to Alaska, Hawaii or Porto Rico. This is a minimum and insurance for greater amounts can be had by paying a larger premium.

In case suit is brought against the holder of a liability policy, the company assumes, in addition to the payment of any judgment not in excess of \$5,000 for one person, or \$10,000 for two or more persons, all expense such as costs taxed against the policy holder, interest accruing after entry of judgment and all expense incurred by the assured in providing needful surgical relief at the time of an accident. In fact the company takes over all responsibility of the insured, appearing for him in all legal matters. Counsel is provided to represent and defend the assured, or any of his employees before the magistrate or coroner.

#### Some More Exceptions

There are a few exceptions under which the company does not pay for damage under this policy. If the policy holder allows his car to be driven by a person under 16 years of age and an accident occurs, the car owner is not protected. Likewise does he forfeit claims for protection if the car is participating in a race, trial or contest, or while carrying passengers for pay. Ordinarily the policy does not cover liability of the policy holder under any workmen's compensation agreement, unless such liability is specifically included by indorsement on the policy and a higher premium paid.

It is requisite that the assured give immediate notice to the company of any casualty, together with all available information he may have, after which, if any suit be brought, even if groundless, the company will defend the case and settle according to the ruling of the court, provided, of course, the damages assessed are not in excess of the amount for which the policy holder is protected.

The liability policy protects the car owner only against loss and damage by reason of claims made on account of bodily injuries, fatal or otherwise, sustained by persons other than those in the policy holder's own family, or employ. Damages for injuries to persons riding in the car of the insured at the time of any accident are not covered by this policy. Further protection is offered in the form of a rider attachable to either the liability or fire and theft policies, known as the property damage indorsement. This covers damage to the property of others.

If one has property damage indorsement he is protected against unruly behavior of his machine. If his car fancies a little window shopping, regardless of the influence of the driver, and should be so eager to view the contents of the show window that it forgets there is a glass in front of the display, then the property damage indorsement on the policy puts the onus of settlement for the damage on the

company writing the insurance policy.

The car bowling along ahead of you on the boulevard may suddenly be confronted by an object which you do not see and the driver may apply the emergency brake with considerable vigor, while you, ignorant of the fact that he is to make a quick stop, plow serenely halfway through the tonneau of his machine. Of course, he expects you to pay, but you can wave your property damage indorsement under his nose and tell him to see your lawyer, which in this case is the company's legal representative.

"But what about the damage to my car in such an accident?" you ask.

I expected that question to arise. This contingency is cared for by another indorsement in the form of a rider, known as collision indorsement, of which there are two kinds—"25 deductible" and "full coverage." The former means that in each individual damage to your car, you sustain \$25 of the repair, but of course you get this kind of protection at a much lower premium rate than you would that afforded by the full coverage indorsement, which protects you against all damages to your own car, no matter how small or how large.

The \$25 deductible form is intended for the policy holder who is careful with his car. Suppose you are backing out of your garage and you crumple a fender by striking the frame of the door. The chances are that this will not result in damage to exceed \$25 and you are the goat. Knowing this, you probably would be more careful than you would if you have full coverage. Getting full coverage for damage to your own car probably is the better of the two forms of collision indorsements, but it resolves itself into a question of dollars and cents. If you hired one bodyguard to help you fight your enemies he would correspond to the \$25 deductible indorsement. In other words, this indorsement steps in when the tide of battle is getting a little too hot for you. Now suppose you want your

guards to fight all the battle and let you be the referee; you get more of them and you pay more for them, the plural guards corresponding to the full coverage indorsement on your policy.

The \$25 deductible indorsement and the full coverage indorsement are exactly the same in form except as the name of each implies, therefore one explanation will suffice for both. This form of insurance indemnifies you for damage to your own car, protecting you from loss arising from damage sustained solely by collision with another object, moving or stationary, excluding all loss or damage by fire from any cause, or from striking the roadbed, or the rails or ties of a railroad, or from upsetting of the car, unless the upset is the direct result of a collision. Further this does not cover tires unless the total damage, including the tires, in any one collision exceeds the sum of \$200.

#### Actual Value Only Liability

The company's liability for loss or damage under either of these indorsements, by reason of any one collision, is limited to the actual value of the property destroyed at the time of its destruction, or the cost of suitable repair or replacement. As is usual in all insurance, if the policy holder and the company cannot agree on the amount of damage, each selects a disinterested party and these two select a third to make an appraisal of the damage and the amount to be paid, the policy holder and the company equally bearing the expense attached to this appraisal.

Only cars fully paid for and not mortgaged or otherwise encumbered are insurable under either of these forms. In case a car is wrecked beyond repair the company pays the insured the catalog list price.

It will be noted in the third paragraph preceding that the company exempts itself from paying for damage by fire in any case under the collision indorsements. Assuming that you have a very bad accident and your car is almost or quite a total

### PLEASE POST IN A CONSPICUOUS PLACE

TELEPHONE WABASH 696

#### Automobile

#### Protective and Information Bureau

Room 1911, 175 West Jackson Boulevard, Chicago, Ill.

Should you know of any "Unclaimed" Cars and will report full description--It is possible we may have on file information which will enable us to offer a substantial reward.

#### LOZIER:

Stolen from Chicago, Ill., Feb. 20, 1916, Lozier Touring Car, 1913 model; Factory No. 7673; State License No. 31376. **\$100.00 Reward**

#### FORD:

Stolen from Chicago, Ill., Feb. 25, 1916, Ford Touring Car, 1914 model; Factory No. 330950; Motor No. 350442; State License No. 76755. **\$50.00 Reward**

#### HUDSON:

Stolen from Chicago, Ill., Feb. 12, 1916, Hudson Touring Car, 1915 model; Factory No. 86603.

#### CORBIN:

Stolen from Chicago, Ill., Feb. 19, 1916, Corbin Touring Car, 1910 model; Factory No. 1509; City License No. 27340. **\$50.00 Reward**

#### FORD:

Stolen from Chicago, Ill., Feb. 17, 1916, Ford Touring Car, 1916 model; Motor No. 877328; State License No. 33841. **\$50.00 Reward**

#### HUDSON:

Stolen from Chicago, Ill., Feb. 11, 1916, Hudson Touring Car, 1916 model; Factory No. 82612; Motor No. 10717. **\$50.00 Reward**

#### FORD:

Stolen from Chicago, Ill., Feb. 19, 1916, Ford Roadster, 1914 model; Factory No. 404734; Motor No. 446202; State License No. 59592. **\$50.00 Reward**

#### HUDSON:

Stolen from Chicago, Ill., Feb. 24, 1916, Hudson Touring Car, 1916 model; Factory No. G-13899; Motor No. A-2557; State License No. 28563.

#### FORD:

Stolen from Chicago, Ill., Feb. 18, 1916, Ford Touring Car, 1915 model; Factory No. 459446; **\$50.00 Reward**

#### FORD:

Stolen from Chicago, Ill., Feb. 12, 1916, Ford Touring Car, 1915 model; Factory No. 446202; State License No. 59592. **\$50.00 Reward**

#### WON:

Stolen from Chicago, Ill., Feb. 12, 1916, Ford Touring Car, 1915 model; Factory No. 446202; State License No. 59592. **\$50.00 Reward**

Underwriters list and offer reward for stolen cars

wreck, and that immediately after the wreck it catches fire and is consumed. Unless you have fire insurance you get nothing; the full coverage for damage would have applied if the wrecked car had not caught fire, but as soon as flames have anything to do with your loss you must have another kind of insurance to protect you against loss. It would seem sound wisdom to be sure the wrecked remains of your car are fairly free of the likelihood of becoming ignited, at least until a representative of the company can make an examination, if you want to get your money under this form of insurance.

Either the full coverage, \$25 deductible, or property damage indorsement can be had in connection with fire and theft or with the liability policy, but one must have either fire and theft or liability insurance in order to obtain any one or two of the three indorsements. None of these is written as separate insurance.

Several factors are taken into consideration in making the premium rates governing liability insurance. In all cases the rate increases with the horsepower of the car, but the rates for a car of the same class and horsepower in one territorial group may differ from those in another, notwithstanding the fact that the insured car, no matter what the rate may be, is covered wherever it may be in the United States or Canada.

#### Difficult to Understand Rates

Rate makers seem to have found many factors not common to the lay mind influencing the making of premium schedules. If there is any valid reason why liability insurance rates in Alabama, Kentucky and Tennessee should be the highest in the country it is rather obscure. Even the men who write the insurance cannot give any satisfactory reason why the rate commission placed a heavier burden on motorists in those states than in any other part of the country, Chicago and New York included.

For example, the owner of a 30-horsepower car in any of those three states just mentioned must pay \$63.50 a year premium on the minimum policy issued, or that protecting him in the amount of \$5,000 for injury or death to one person and of \$10,000 for two or more. In Chicago and St. Louis the same policy can be obtained upon the payment of \$56.50 a year premium; in New York, Minneapolis, Detroit, Cleveland, Cincinnati and Chicago suburban territory, \$50.50; Boston, \$44.50; Baltimore and Pittsburgh, \$36.50, and in California, Colorado, Washington, Texas, and the rural districts of more than one-half the states, \$37.25.

The plea for a lower horsepower rating, that is, according to the N. A. C. C. formula, on the part of motorists who pay for their licenses on the basis of N. A. C. C. horsepower seems to be bearing fruit and any reduction in the bore of the cylinders will benefit the prospective liability insurer as well as the license buyer.

As an illustration of the method of arriving at premiums let us assume that the car to be rated is a Packard, 1914 model,

No. 38, touring car. The first thing to ascertain, from a list of all makes and models printed by the insurance company, is the horsepower of this machine.

Referring to the horsepower table, it will be found that the different body styles of the car in question come under different classes. This is for grading as to the risk in writing collision insurance. Collision insurance is written under a graded scale of rates. Thus, if you have a car with a runabout body it is less likely to great damage than a limousine or brougham would be, hence you pay a lower rate. Each car is classified according to its body in the list of all makes compiled by the company, and the rate for this class of insurance fluctuates less than the liability premium. The rate for full coverage in all cases is \$35 a year more than for the \$25 deductible indorsement.

The rate book table shows that the Packard referred to previously, which is in class P, carries a premium of \$100 for the \$25 deductible indorsement each year and \$135 for full coverage. The coupe class Q, comes \$10 a year higher than the touring, and the limousine, class R, \$10 more than the coupe, while with the more elabo-

rate imperial limousine body, class S rates apply and the car will be protected for \$30 a year more than the touring car, with either partial or full coverage.

Liability insurance protects the car owner from damages to others arising from bodily injury done them by his car, when he is driving. For 10 per cent additional premium he may cover one other member of his family or an employee, for 12½ per cent two and for 15 per cent three. If someone besides the policy holder is driving the car at the time of the accident and their name is not written into the policy, action may be brought against them, but in case the owner of the car is brought into a suit, he is protected, and the driver of the car, too, if his or her name is in the policy.

The policy may be made to cover the car owner's private chauffeur, by paying the additional premium shown in the table elsewhere, but he is the only occupant of the insured car who can be covered under the liability policy.

Public cars and commercial vehicles come in under a different rate and will be treated in some succeeding article of a more technical nature in future issues.

## Urge Motor Car Risk Men to Unite

### National Organization Sought With Power to Prescribe Uniform Rules of Practice

CHICAGO, March 14—At a meeting of the Western Automobile Underwriters' Conference next Thursday in Chicago, discussion will center about the plan proposed lately in the East for creating a national organization to have the power of establishing the rules of practice in writing policies on motor cars, or against fires, thefts and similar risks. The same question was debated before the Automobile Conference, the eastern organization, at a meeting March 15.

Three groups of motor car insurance companies are concerned in the scheme to merge the sectional conferences. Besides the Western conference and the organization in the East, the companies not now affiliated with either body as to a large extent united in support of the plan. Some of these outside companies have deviated from the rules of the organized underwriters, but the initiative in the movement to create a national body has been taken by certain of the outside companies.

Objections to the present rules of practice for writing motor car floater policies to cover fire, self-ignition, explosion, and other perils, still exist among the non-affiliating companies. Other objections are made by those within the two organizations, though sentiment in the eastern conference favors the establishing of a national body. The Western Automobile Underwriters' Conference, which has offices in Chicago, according to the chairman of its executive committee, fears that a

national organization will not have the advantage that comes from knowing local conditions. He declares it essential that local factors be recognized.

#### MANY CARS IN MICHIGAN

Detroit, Mich., March 10—During the past year 112,910 motor cars belonging to Michigan people, or rather to residents of the Wolverine state, were registered. In addition, 1,935 license numbers were issued to residents from other states, mostly, however, from Canada, which brings the total number of licensed cars for the year 1915 up to 114,845.

In the compilation of the statistics mentioned in this article, it is the purpose to show how many cars were actually registered or licensed by the people of Michigan. For that reason nearly 2,000 cars belonging mostly to Canadian residents, but mostly all American-made or assembled from American-made parts, are not taken into consideration.

The 112,910 cars in this state last year include the product of 412 different manufacturers, some long ago out of business, some still in business but under a different name or merged with another or other concerns, some of which only one or two made up their entire output.

There are 111,132 gasoline cars on the past year's registration records, of which 108,051 were passenger cars and 3,037 were commercial vehicles. This is less than 3 per cent for the latter class of cars.



# Boy Who Persisted Now Rides in "G-3," Home-Made Roadster

## Belt-Driven Machine, Product of Boy's Ambition to Own a Motor Car, Deserves Its Name by Making 14 Miles Per Hour

EVERY youngster old enough to read the war news invariably names his home-made motor vehicle or pushmobile after a submarine. It is the "U-6," the "U-4," or something similar. Clarence Sutcliffe, of Aurora, Ill., has christened his new home-made motor car "G-3," after the newest submarine of the United States navy, a giant of its kind.

Young Sutcliffe is a practical-minded lad. The problems propounded by his teachers interest him less than the electrical contrivances, mechanical devices and the chemical equipment in the small workshop where the "G-3" was built.

Scrap heaps serve as his source of raw materials. When 9 years old he mastered the Morse code and constructed a telegraph line with sending and receiving instruments. Tin cans, lead pipe, old washing machines and other discarded articles are transformed by this youth into steam engines and original mechanical devices. The triumphant achievement of all is the "G-3." Older heads laughed and his parents were reluctant about buying him a motor for fear of an accident. Clarence persisted and one day he led the completed car forth for its maiden trip.

### Creates Sensation

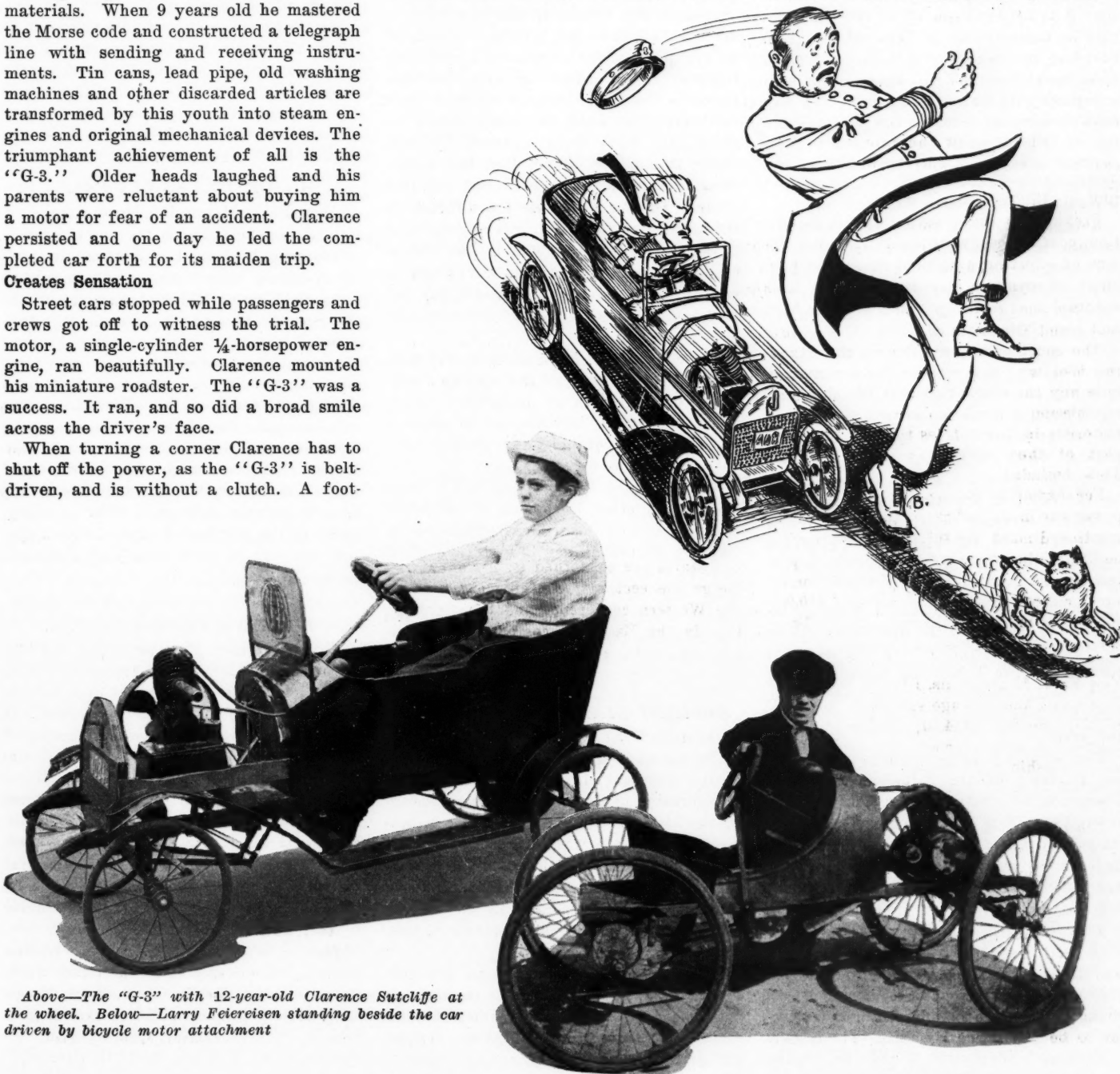
Street cars stopped while passengers and crews got off to witness the trial. The motor, a single-cylinder 1/4-horsepower engine, ran beautifully. Clarence mounted his miniature roadster. The "G-3" was a success. It ran, and so did a broad smile across the driver's face.

When turning a corner Clarence has to shut off the power, as the "G-3" is belt-driven, and is without a clutch. A foot-

pedal shuts off the spark. When the lever is released the engine starts again. This machine will make 14 miles per hour. The frame was obtained from another boy who had used it in a pushmobile. The entire car, with engine, body and attachments, cost \$28. Clarence expects to build a life-sized motor car some day.

Larry Feiereisen, of Janesville, Wis., is the owner of the small motor car mounted on bicycle wheels, shown in the lower illustration. Mr. Feiereisen needed a made-to-measure car, which would be an assistance to him in going about the streets, and, although he is not much larger in stature than young Sutcliffe, he has

evolved a machine which should take the lead in a race with the "G-3," the loads being equal. The seat, steering wheel and hood came from a "pedomobile." A motor attachment and wheel which Mr. Feiereisen had purchased for his bicycle, furnishes the power, the other wheels being ordinary bicycle wheels. The frame and springs were made to order. Then he installed the clutch, a two-speed steering gear and a brake. The car has a wheel-base of 54 inches and weighs 143 pounds. Its owner has been known to exceed the speed limit, as he can make 25 miles per hour. Small cars have a decided advantage in these days of high-priced gasoline.



Above—The "G-3" with 12-year-old Clarence Sutcliffe at the wheel. Below—Larry Feiereisen standing beside the car driven by bicycle motor attachment

# Injunction Issued in Rim Patent Fight

## Court Prohibits Manufacture and Sale of Stanweld Rims and Upholds Perlman Claims

NEW YORK, March 12—An injunction was issued Wednesday by the United States district court for the southern district of New York by which the Standard Welding Co., Cleveland, O., maker of a large proportion of the demountable rims used on motor cars, is prohibited from further manufacture and sales of such rims. The injunction is the result of a suit brought by Louis Perlman, New York, against the Standard Welding Co., charging infringement of Perlman's basic patent on demountable rim construction and applies to this type of rim only.

This court action ranks second in importance to the Selden patent decision, in that it is believed to affect the manufacture of the majority of demountable rims. Stopping production of a large percentage of demountable rims will have serious consequences with many car concerns, and may require using clincher or quick-detachable types. It is impossible at this time to forecast the consequences.

### Fail to Agree

Previous to the granting of the injunction conferences were held with the object of effecting a settlement by the payment of royalties and damages, but it is reported that royalties asked were too high and negotiations failed.

The court of appeals denied the Standard Welding Co.'s petition for a rehearing based on the contention that Perlman's alleged date of invention is wrong, and that his patent is invalidated by the Tillinghast patent, which is alleged to be of prior date. The petition also cites a decision by the court of appeals of the District of Columbia, alleging that it definitely limits the breadth of the claims in Perlman's patent so that they do not cover the Standard Welding construction.

A motion by the Standard Welding interests, to include in the mandate a clause in regard to the right of the district court to suspend the injunction upon sufficient cause being shown and after due notice, was also denied by the court of appeals in the case.

The serious consequences to the motor car industry of the enforcement of the injunction may be realized when it is considered that over 700,000 of the cars to be made this year may use demountable rims and that a large percentage of the output has been furnished by the Standard Welding Co.

The Standard Welding interests state that Perlman's demands are exorbitant, and that, while they are willing to pay the inventor a reasonable sum and a just royalty on future manufacture, they cannot meet the terms he names at present.

Perlman's contention is that his claims

are reasonable, and that, as he has consistently maintained, he seeks an equitable, fair and honorable adjustment for all concerned.

### Stanweld Stops Manufacture

Cleveland, Ohio, March 13—The injunction secured against the Standard Welding Co. by Louis Perlman last week has been in effect since last Friday and the company now is not turning out a demountable rim. It is understood that no effort will be made to resume the manufacture of rims until some definite conclusion is reached as to what may be done in the future.

It is said that, in order to protect its contracts, the Standard Welding Co. will make an effort to get all those interested in the production of rims and their use together in an effort to have the case taken to the United States supreme court for review. In order to do this, under the rules that have been adopted by that court, it must be shown that the matter is of widespread general interest and that a large number of people are affected by it. Otherwise the court will not agree to a review. This was done in the Selden case some years ago, but so far as can be recalled now the supreme court has not reviewed any other patent infringement case since.

The company, it is understood, has some of the best attorneys of the country studying the case, but in all probability no announcement will be made as to decisive steps until the details of the decision have been thoroughly digested.

The Standard Welding Co. has a large business in other lines and, if compelled to keep the rim department idle for some time, in all probability it will have all it can do. The principal thing in taking any steps that may be decided upon in the future is the protection of its patrons and the business that they have been depending upon for their supplies.

### SHIPMENT STATISTICS SHOW WELL

Detroit, Mich., March 11—A total of 21,502 carloads of motor cars were shipped during February, 1916 or 9,529 more than in February, 1915. It is the biggest month in the history of the industry and is better by 1,529 than was the record-breaking month of January, 1916.

During the first 2 months of the year the carloads of cars shipped totaled 41,089 as compared with 19,973 for the corresponding 2 months of 1915.

These figures are official and are furnished by J. S. Marvin, traffic manager of the National Automobile Chamber of Commerce, who further states that the freight car situation in general shows no improve-

ment. More confidence is shown by the manufacturers in shipping on flat cars, especially when the latter are boxed in and this kind of shipment is increasing rapidly.

At the meeting of the American Railway Association held in Chicago this week, and which was attended to by Mr. Marvin, it was suggested that probably the only way to relieve the freight congestion, is to increase the freight demurrage charge on freight cars held for unloading. A rate of \$2 per day was suggested and may be adopted.

### LOCOMOBILE TRUCKS CALLED RIKER

Bridgeport, Conn., March 11.—The name of Locomobile as applied to motor trucks built by the Locomobile Co. of America, this city, has been changed to Riker, the new name being a distinct recognition to the work of Andrew L. Riker, now vice-president of the company, and who has been in charge of engineering since the four-cylinder Locomobile car was brought out in 1902. Although the name Locomobile will be discontinued as applied to trucks, the Locomobile passenger cars will continue the use of the name Locomobile as they have done in the past.

### MOTOR TRUCKS GET PRAISE

New York, March 11—Motor trucks received high acclaim at the snow removal conference held at the Automobile Club of America, here recently. This conference, held under the joint auspices of the division of highway engineers, the division of municipal engineers, the National Highway Association, Society of Street Cleaning and Refuse Disposal of the United States and Canada, the Automobile Club of America, the Citizens' Street Traffic Committee of Greater New York and the graduate course in highway engineering of Columbia University attracted a gathering of 119 persons concerned with or interested in the problem of rapid and economical removal of snow from city thoroughfares.

### J. F. DAVIS HEADS C. A. T. A.

Chicago, March 13—Last night the Chicago Automobile Trade Association held the largest motor car banquet ever held in the Windy City if not in the country. It was the occasion of the annual meeting of the organization and 668 sat down to dinner, this number largely made up of local dealers and salesmen. There were several out-of-town guests, including Prince Wells, Louisville, Ky.; N. E. Osmond, Milwaukee, and President Lee of the Syracuse dealers' organization. President H. M. Allison, who has headed the local organization for 2 years and refused to head it longer, was succeeded by Joseph F. Davis, Winton branch. Others elected on the ticket were: Vice-President, Erwin Greer, Ford; Treasurer, Henry Paulman, Pierce-Arrow; Secretary, W. G. Tennant, Oakland; and directors J. W. McGuire, Republic tire; Wal-



ter L. Gaithins, Maxwell; F. H. Pietsch, Packard; and J. L. McLaren. The past season has been one of the most prosperous in the history of the association, which now has 115 members.

#### SPLITDORF TO DOUBLE PLANT

Newark, N. J., March 10—Ground has been broken for the new addition to the plant of the Splitdorf Electrical Co., this city. This new six-story building will practically double the present production of 1,500 Splitdorf magnetos a day and will add approximately 110,000 square feet in space.

#### ENGINEERS ANNOUNCE LECTURES

Indianapolis, Ind., March 13—C. E. Sargent, chief engineer of the Lyons-Atlas Co., will read a paper before the Indiana section of the Society of Automobile Engineers, March 31, dealing with the question of increasing the efficiency of the combustion engine as a means of overcoming the handicap to motor car dealers and manufacturers which would result if gasoline prices remained permanently high.

#### TOFT GAINING; KINCAID WORSE

Los Angeles, Cal., March 11—Omar Toft, the driver who was injured in practice on the Ascot speedway, March 4, when the Omar car turned turtle, is recovering from his injuries rapidly and will be able to leave the hospital within another week. Arch Kincaid, the mechanic of the Omar, is not so fortunate, however. Physicians announce that it will be at least weeks before anyone can see the injured mechanic, as his condition is critical.

#### TO CONSTRUCT RUSSIAN PLANTS

New York, March 9—A string of motor car plants will be built in Russia this year. Benton Hopkins, representing Samuel Austin & Son, Cleveland, engineers and builders, has started for that country to open the way for the construction of these plants.

The plant immediately under consideration is the first one of a group of twenty-seven large ones, which are to be erected in Russia as a part of a great movement for placing Russia on the map industrially. A group of influential Russian people are back of the project.

#### TRIALS AT DAYTONA-ORMOND?

Chicago, March 13—After a long period in which the most exciting things occurring at Daytona-Ormond beach have been bathing and wintering far from the nips of Jack Frost, it is reported that this old beach course is to hear the roar of exhaust again in the very near future. It is said that the Hudson Motor Car Co., Detroit, Mich., will ship a special Super-Six model to Florida within a few days for a series of tests over the same course where Bob Burman, in a Blitzen Benz in April, 1911, established the world's record for 10-mile straightaway, in 25.4 seconds, an average of 141.69 miles per hour.

## Overland Financial Report Shows Gain

### Earnings on Common Stock Are in Excess of 45 Per Cent—Big Surplus

TOLEDO, March 13—The annual report of Willys-Overland, Inc., for the fiscal year ending December 31, 1915, which has just been made public, shows a net income of \$9,870,687 for the year, after setting aside \$1,000,000 as a reserve for contingencies. With this reserve added, the figure is equal to over 45 per cent earned on the \$21,000,000 of outstanding common stock after figuring 7 per cent on the preferred stock of \$15,000,000. The report also shows a profit and loss surplus at the end of the year amounting to \$14,720,550, as against \$7,651,931 for the previous year, or practically double, thus evidencing the excellent condition of the concern at the start of its largest production year. During 1915, there was redeemed \$250,000 of preferred stock, this amount being included in the surplus account.

The total of assets and liabilities reached \$58,908,803 as compared with \$43,407,482 the previous year, and in this, the item of good-will, patents, trade-marks, etc., is still set down at \$14,059,932. As an evidence of the plant and real estate extensions of the Overland concern, the increase of the item covering these from \$9,127,188 to \$16,945,453 this past year is of interest. It shows plant and equipment appreciation of over \$7,500,000. The inventories account covering parts and materials on hand also took a big jump from \$9,648,745 to \$17,752,812.

Comparative balance sheet and report for 1914 and 1915 follow:

Net after expenses, taxes, repairs, depreciation, etc.	\$11,201,255
Reserve for contingencies	1,000,000
Interest	330,577

Net income	\$ 9,870,678
Preferred dividends	322,165

Surplus	\$ 9,548,513
Common dividends	2,299,895

Surplus	\$ 7,318,618
Redemption of preferred stock	250,000
Previous surplus	7,651,931

Profit and loss surplus	\$14,720,550
-------------------------	--------------

The consolidated balance sheet of the Willys-Overland Co. and subsidiaries, as of December 31, 1915, compares as follows:

ASSETS		
	1915	1914
Good will, patents, trade marks, etc.	\$14,059,932	\$14,059,932
Real estate, buildings, plant and equip.	16,954,453	9,127,188
Investment in and advances to affiliated companies	680,286	2,251,767
Inventories	17,752,812	9,648,745
Balance due from European agents and domestic selling companies	1,081,770	901,942
Accounts receivable	1,929,757	1,813,656
Notes receivable	2,048,494	1,501,283
Miscellaneous investments	70,475	49,925
Cash	4,023,342	3,928,098
Deferred charges to future operations	316,482	124,943
Total	\$58,908,803	\$43,407,482

LIABILITIES		
	1915	1914
Preferred stock	\$ 4,483,700	\$ 4,721,000
Common stock	21,000,000	20,000,000
Real estate mortgage assumed	448,269	131,500

Notes payable—bank loans	10,200,000	4,434,476
Trade accounts		3,164,820
Accounts payable	4,942,179	1,669,273
Pay rolls and salaries accrued	216,560	46,590
Customers' deposits	451,944	291,760
Taxes and interest accrued	164,426	114,021
Reserve for rebates to customers	424,838	235,485
Reserve for car repairs	30,000	30,000
Reserve for royalties payable	30,000	
Preferred dividend payable January 1	78,465	82,617
Reserve funds	1,717,873	834,005
Profit and loss surplus	14,720,550	7,651,931
Total	\$58,908,803	\$43,407,482

#### NATIONAL CARBURETER FAILS

Chicago, March 14—A voluntary petition was filed last week by officials of the National Carbureter Co., maker of the Edwards carbureter, asking that a receiver be appointed. This action, followed a creditors' petition recently filed, asking that the company be declared bankrupt.

#### CANNOT FORFEIT FORD FRANCHISE

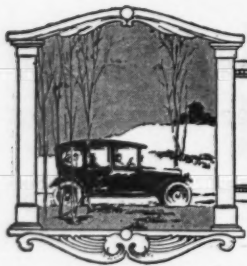
San Francisco, March 10—Governor Johnson and other state officials have been enjoined by the United States district court from declaring forfeited the franchise of the Ford Motor Co. in California, which became delinquent March 4 through nonpayment of \$24,000 in franchise taxes.

Attorneys for the company said they would make a test case of the state's right to tax foreign corporation franchises.

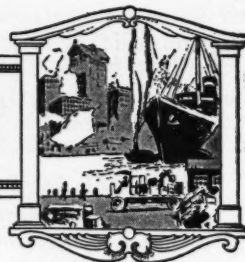
#### SPECIALIZES ON ROAD REPAIR

Harrisburg, Pa., March 11—The work of the Pennsylvania state highway department during the year of 1915 has been almost entirely that of maintenance. According to the records of the maintenance division, the improved roads maintained in 1915 to October 1 are 8,262.68 miles out of the total system of 10,200 miles. The following gives the subdivision of the total, mileage of stone or other hard-surfaced roads, 1,880.48; mileage of flint, gravel and shale roads, 557.75; mileage of earth roads dragged and scraped, 5,824.45.

In addition to this vast mileage worked over, the maintenance division of the state highway department has resurfaced, during the present season to October 1, 396.99 miles. There is little more to be said of the department during 1915. The mileage covered, comprising three-fourths of the entire system, has left few roads of importance that have not received attention, and, in the most cases, this maintenance work has been of a semi-permanent character, except, of course, on the earth roads where each season brings new requirements in the way of maintenance.



## EDITORIAL PERSPECTIVES



### Garage Organization

THESE are days when a wave of garage organization is sweeping over nearly all of the states of the union. Associations of garagemen were formed several years ago, but the movement only attained impetus within the last 2 years. Today many garagemen are realizing what benefits come from organization and they are overstepping in organization activity. A few are getting together to form state associations, in another place a few are forming national organizations, and so it goes. There are today three or four organizations that claim to be national organizations for garagemen. They have no pretense at national membership, but to get more advertisement and perhaps get more money they are using the national name.

UNFORTUNATELY garagemen are suffering, due to this widespread promotion and because the professional organizer has been going abroad throughout the land, talking the benefits of organization yet working solely for the dollars and cents he will get. In several states he has taken a large percentage of the funds unto himself that should go to the organization. He has run the organization to suit himself and after a year or perhaps longer the movement has lapsed into a state of coma, and organization work has received a stifling blow; one that will not be soon forgotten.

ORGANIZATION work for garages or for any other organization should come from within. It should spring from the wishes of the garagemen, rather than be forced upon them by some glib-tongued promoter. Those organizations that have

been most beneficial and most enduring have sprung from the activities of those forming the organizations. Garage organizations are needed today. The garageman has not that degree of protection under the law which the hotel man has. It is a serious offense if you attempt to avoid paying your bill in a hotel. There is practically no escape. On the other hand the garageman dealing with transients has not the law behind him like the hotel man has. Organization of garagemen will bring such a law about. The garageman requires more assistance from the law than he is receiving.

GARAGEMEN will have to act more in concert to get what they require. Organizations for such must come from within. Such an organization will require the services of a very able executive to carry out the work and push the activities of the organization, such an executive acting at the bidding of the board of directors. Such an organization and such an executive are entirely different from the professional promoter, taking unto himself the credit for having done everything that has been done to benefit the garageman in any or all states, and using this talk as an instrument to extract more funds for his personal advancement. Such a promoter is acting only for himself and by himself. As soon as the organization starts dictating orders to him he withdraws and goes in search of more green field. Let all garagemen beware. Before giving money or joining any association look into it, investigate it, and be sure it is an organization of garagemen and not a tool of some promoter. Then you will not have cause to regret it later.

### The Spring Battery

IF your car is in winter storage and you have not taken the battery out of it, we advise that you do so now. Remove the battery and turn it over to the battery man. If there is not such in your town, take it to your garageman, providing he knows how to charge it and look over it. If he is not competent, you can perhaps get service from your local electric light and power company. Last fall we advised that you have the battery taken out when you put the car away. We take it for granted you did that. Some did not. Those who did not will be disappointed when they take the car out in the spring to find the starter will not crank the motor as it did last fall. You will have more or less trouble. Perhaps you did get the battery recharged, but you soon find that it is discharged. You did not have that trouble last year. You did not think it was possible to happen, but here it is. You have left your battery too long in the car. It has discharged, it has injured itself.

TAKE time by the forelock now and get the battery out a week, two weeks or perhaps a month before you are going to get the car out. If the battery has to be overhauled, have it done now before you want the car. Have your battery ready when the car is ready. It is annoying to have a battery too weak to properly crank the engine. Today is the time to avoid this possibility. It will do the battery good to be well charged so that it is in good condition when the touring season opens. If you did not give your battery the proper care when you put it away last fall, you hardly can expect it to come out in first class condition after its period of rest. They are not like wine. They do not improve from standing.

### Speedway Elimination Races

IT is to be hoped that speedway officials are not going to impose on the public such an uninteresting, long-drawn-out program of qualification trials the week preceding their big races that they indulged in last year. Instead of making all twenty or thirty racing cars qualify in one day or two at the most the events were strung out over a week, and in some cases a little longer. A good charge was made for general admission and when the spectator got inside he or she waited several hours to see one or two cars practice around the oval. Such was not fair to the public that paid its money to see more, much more, and sooner or later the time will come when the public will demand a better system of scoring.

FOR this year eliminations should be carried through in one day or not more than two afternoons. More time is not needed. Last year the racing cars were not ready. The officials waited hour by hour for them to come out. When they arrived on the track their cars were not well tuned up and the trials dragged hour by hour and day by day. The public attended only fairly well and will attend much more poorly this year if such tactics are resorted to. Let there be one real day of eliminations so that a spectator who pays his dollar to see the different cars race around the oval to get their speed marks will really see such, and will not spend his afternoon waiting for the wind to drop so that a little faster time can be made. There should be a regular schedule of trials. If these are due to start at 3 o'clock, they should start as punctually as the big events. This is what the public wants and this is what will make more money for the promoters and speedway owners.



## What Do You Mean? "A Gallon of Gas"

### Is It Canadian or American Measurement You Refer To?

WHEN is a gallon not a gallon? That all depends on the point of view. Also on where you may be at the time. It is not a gallon when mentioned by a Canadian in the United States. It is not a gallon when alluded to by a citizen of the U. S. A., temporarily in the Dominion.

This startling fact recently came to light at the Maxwell headquarters in Detroit, in the progress of an effort to reconcile some performance of Maxwell cars in Canada with feats of record in the United States. R. F. Girdwood, Montreal Maxwell distributor, told of Maxwell economy as demonstrated under his observation.

#### 44 Miles Per Gallon

"They often average around 40 miles to the gallon of gasoline," he declared. "I, myself, have driven one of them on a trip where we undoubtedly scored better than 44 miles on a run of more than 200."

The man to whom the statement was made was bewildered. He knew that authentic records existed of long trips in which Maxwells had scored averages around 36 or 37 miles to the gallon. Mr. Girdwood's feats, however, were out of line, suggesting road conditions or inflammability of atmosphere altogether unknown south of the Canadian border.

"What do you mean by 'gallon of gasoline?'" he asked.

"Why, regular, imperial measure gallon, of course," replied Girdwood.

A great light dawned on the factory man. Investigation disclosed that the English gallon, on sale in Canada, is almost 20 per cent larger than the gallon measure provided in the United States.

Motorists who have toured in both the United States and Canada now will understand why their per gallon mileage has been so much greater north of the border. Those desiring to establish economy records for their cars also will be interested to know that in Canada it is easy to improve their best U. S. A. performances. Similar conditions also hold true with regard to oil and its consumption. Conversely, Canadian motorists who make light of supposedly meritorious feats in American economy—feats which they themselves readily can excel without half trying, wisely will make allowance for the fact that the American gallon is only part of the gallon they pour into their tanks.

#### MARK LINCOLN HIGHWAY

Oakland, Cal., March 11—Oakland is to see that the Lincoln highway is marked as far east as Salt Lake City, with signs pointing the way, and indicating the num-

ber of miles to this city, the western terminus of the great road.

The Lincoln highway committee of the Oakland Chamber of Commerce is active in the work, and already a large portion of the necessary money has been raised. More will be forthcoming from the motor power show that is to be held in Oakland's \$1,000,000 municipal auditorium, beginning April 24, when 20 per cent of the gross proceeds will be given to the Chamber of Commerce for the highway work.

#### CARS AUGMENT CHURCH-GOERS

That the motor car is an important factor in building up the membership of the country church is the assertion made by the Rev. Dr. F. F. Bahner, a prominent minister of Waynesboro, Pa. Dr. Bahner says that the membership of the Salem Reformed church, of which he is the pastor, is growing steadily through the increasing number of cars owned by the country people. The pastor advises:

"My suggestion for building up a church is for the country people to procure motor cars and take their families and neighbors to church each Sunday. The motor car will be the salvation of many country churches. My experience in country church work is not as disheartening now as it was several years ago. The motor car has helped very much in building up the church."

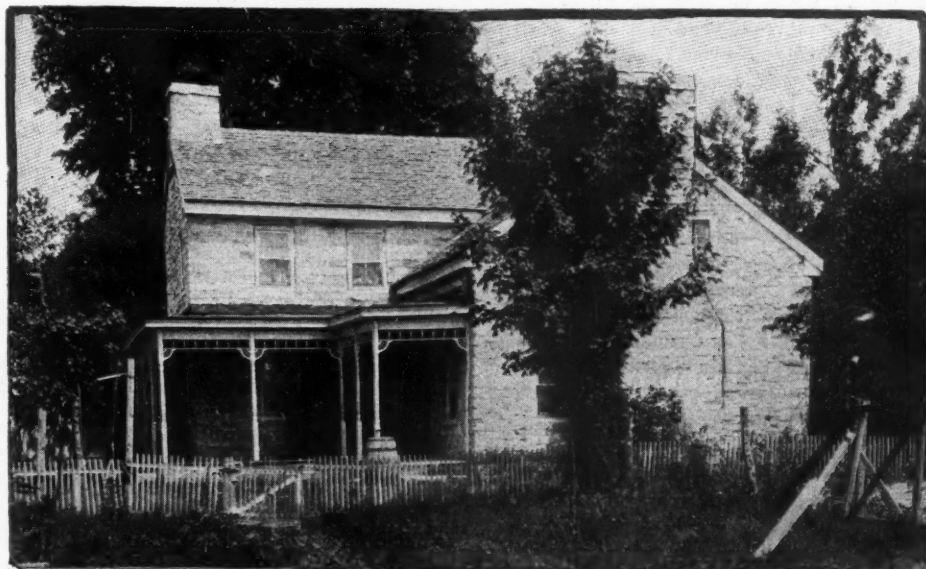
## "Gum Shoe" Work to Recover Stolen Cars

### Overland Has System Protecting Car Owners Against Theft

IN these days when the Bertillon, the finger print and the numerous other systems of running down criminals of all kinds are at the command of our police and detective departments, it is rather unusual to discover an establishment with a real live thoroughly-organized "gum-shoe" department of its own. Yet that is what the Willys-Overland Co., Toledo, O., maintains for users of its cars, who suffer from thefts of their cars. It is a simple system.

As soon as an Overland car is stolen its owner notifies the Overland dealer in his district. The dealer in turn notifies the factory. At once a description of the stolen car, and the facts of the case, are dispatched to all Overland dealers in the United States. These are posted in conspicuous places, and the dealer and his employees are instructed to be on the lookout for a car answering the description, as it is a certainty that the car will turn up at an Overland garage.

# See America First — • • • See America Now



EDITOR'S NOTE—This is the seventieth of a series of illustrations and thumb nail sketches of the scenic and historic wonders of America to be published in Motor Age for the purpose of calling the attention of motorists to the points of interest in their own country.

#### NO. 70—BUILDING WHERE INDIANA LAWMAKERS LIVED FROM 1814 TO 1825

WHEN early Indiana history was made Corydon and not Indianapolis was the seat of government. Above is shown the old Capitol Hotel which was erected in 1814 and occupied by the law makers of Indiana from 1814 to 1825. This old structure is still intact after over a century of use and is preserved as one of the relics of early Hoosier days.

# A. A. A. Revises Its Entire Schedule of Official Records

## Non-Competitive Division Created to Care for a New Class of Tests

### Stock Chassis Rules and Provision for 24-Hour Events

NEW YORK, March 9—The recent official performances of the Hudson super six stock car on Sheepshead Bay speedway, November 25, under A. A. A. sanction and supervision, were incorporated into the official records of the contest board of the American Automobile Association at its meeting here today. The records granted are non-competitive ones, namely, those in which only one car was on the track, and occupy a separate division from competition records. It was necessary for the contest board to revise its entire schedule of official records and create a non-competitive division. This division covers practically the same field as the present competitive records and includes all classes of speedway distances according to piston classification; 1 mile circular dirt track distances; speedway records regardless of class; straightaway free-for-all records; stock chassis straightaway records; and 24-hour records.

Under this new classification new Hudson non-competitive records are granted:

**Hudson Records**

Stock car non-competitive records—piston displacement 231 to 300 cubic inches.

10 miles.....	7:54.4
20 miles.....	15:45.8
50 miles.....	39:30.8

Under the revision of the official record table it will be possible for manufacturers and others to secure non-competitive stock car and stock chassis records as well as non-stock car and non-stock chassis records. The revised record sheet is sufficiently comprehensive practically to embrace all forms of tests that may be expected for several years to come. In the reclassification all existing records of various classes are continued as heretofore. Up to this time there has been some confusion between records made in competition with other cars and those without competition, namely a single car on the track. The board was convinced it was not right to put competitive and non-competitive records in the same division and hence the new arrangement in which all competitive records are classified under Division 1 and all non-competitive records under Division 2. There are arrangements for official fuel economy records, etc.

The further important work of the board was the drafting of specific rules for stock 24-hour races. There has been a demand for such and already a sanction has been granted for a stock car race June 16 and 17. The new stock chassis rules permit of certain options on the chassis. A stock chassis is defined as:

"A motor car chassis, which, for the options and requirements listed below, can be added the necessary parts, be assembled into a complete stock car."

The options or changes in construction of the chassis permitted are merely those

made necessary by safety in driving and others due to removing the body. Thus it is possible to remove leaves from the springs; to change the angle of the steering column for safety purposes and also to make whatever changes are necessary in gearshift and brake levers as well as pedals. Wire wheels are optional and the rear axle gear ratios such as the standard axle construction will permit.

Certain requirements are added under the new rules: Thus bonnet straps must be carried, fenders and running boards must be removed, and only stock arrangements of ignition, lighting, starting, carburetion, lubrication, cooling, etc., are permitted. Not the slightest change is allowed in any of these systems. The tapping of electric connections at terminals, and the taping or wrapping of piping used in the fuel, water, gas or other lines prohibited. The chassis must have complete set of floor boards and standard dash. Wrapping of springs not permitted. In the race the complete lamp equipment is necessary.

Under the stock chassis definition it is naturally permissible to remove the body, running boards, brackets supporting same and other parts which do not serve any direct part in the function of the vital parts, but which are necessary because of the body.

Considerable routine work was carried out at the meeting: Percy Keene, driver, Danbury, Conn., was reinstated; Roy F. Metz, driver, Detroit, was declared eligible for registration; Joseph L. Mazuco, driver, Chicago, was reinstated. Terms of disqualification were reduced on the following drivers so as to terminate at dates mentioned: C. D. Klein, July 1; William E. Brown, September 1.

E. H. Shannon, California, was suspended until July 1, for failure to report to officials and failure to start at a California meet, December 28.

The Maxwell racing cars recently purchased by Ray Harroun from an outlaw promoter, were reinstated on the ground that when these cars were leased to the promoter under the terms of the contract with the Maxwell company, the promoter was in good standing. The mile track at Kalamazoo, Mich., was reinstated on recommendation of Clifford Ireland, board representative, Illinois.

#### GETS VANDERBILT AND GRAND PRIZE

New York, March 13—Santa Monica has been awarded the Grand Prize and Vanderbilt cup. Elgin's request to the Motor Cups Holding Corp., for the right to hang up the two trophies for competition in August has been turned down. At a meeting of the contest board of the American

Automobile Association yesterday in New York the sanctions for the two classics were awarded to Santa Monica.

The southern California promoters will stage the two blue ribbon events in November, the meet opening with the Vanderbilt cup race on Thanksgiving day and closing with the battle for the grand prize on the Saturday following, giving the drivers but 1 day in which to overhaul their cars.

#### WOULD REVIVE FAIRMOUNT RACES

Philadelphia, Pa., March 13—A movement is on foot in this city to revive the Fairmount park races that were so popular a few years ago. A hostile city administration prevented a continuation of the races, but with a new mayor in office it is believed the people will have their wish gratified.

Frank Hardard, former city councilman, is heading the movement. The races were held by the Quaker City Motor Club, and although \$18,000 was raised, the club did not receive any money, it going exclusively to various charities, including the police pension fund and the Fairmount park police fund. At these races approximately 500,000 persons were present, and the city received a good deal of advertising.

#### ANOTHER RACE AT ASCOT

Los Angeles, Cal., March 13—There is to be another race on the Ascot speedway March 19. The programme calls for four events.

Barney Oldfield, who is the idol of the speed followers in southern California, will drive the 300-horsepower Christie in an attempt to break the course record of 47 seconds, which he established March 5. There is to be a 10-mile race free-for-all Class D event in which fourteen cars will be allowed to start, and the main event is a 100-mile challenge race in which Bob Burman will meet Earl Cooper and Eddie Pullen.

The course proved very expensive to the drivers in the 100-mile race, March 5, on account of the tire-eating qualities. It was on this account that George R. Bentel, the speedway manager, let the contract for a surfacing of asphalt over the entire mile, which was formerly macadam, with a rock base and rolled oil surface.

Immediately following the Corona race, there is to be a 100-mile free-for-all on the Ascot speedway, according to the announcement of the manager.

#### CORONA RACE APRIL 8

Corona, Cal., March 11—Practice for the Corona Grand prize, scheduled for April 6, to be run on the famous Grand Boulevard of the Circle City, will start March



30, according to announcement made by President Peeler, of the Citrus Belt Racing Association, promoter of the \$1,200 speed classic. Two days after the practice begins, elimination trials are to be held, if there are more than twenty entries, and the field will be cut down to the twenty fastest cars.

#### TO RACE THREE FRONTENACS

Detroit, Mich., March 13—Louis Chevrolet, having completed experiments with the aluminum engine he made last fall, now is completing three brand new racing cars for competition on the speedways during the present year.

These are said to have aluminum motors. The cars will be known as Frontenacs and will be driven by Louis, Arthur and Gaston Chevrolet.

It is expected that the first of the three will be ready early in May and will appear first on the Sheepshead Bay speedway. The other two also should put in an appearance at Indianapolis.

Chevrolet is building every part of the cars to his own design, from engine to rear axle, and expects to get a minimum of 125 horsepower from each motor. Light weight has been an aim, and the completed car is scheduled to turn the scale at not more than 1,750 pounds.

#### DES MOINES SPEEDWAY EVENTS

Des Moines, Ia., March 13—Geis Botsford, manager of the Des Moines Auto speedway, announces the complete program of events for the season of 1916. A racing meet, limited to Iowa entries, will open the season on Memorial day. The big event of this meet will be the Iowa derby, for a distance of 20

miles, and with entries limited to Iowa-owned cars. There will be a 10-mile race with entries limited to Des Moines cars.

The big event of the year for the Des Moines speedway will be the 300-mile free-for-all on June 28, with minimum speed requirements, a technical committee to determine the qualification of drivers, and a purse of \$10,000.

A non-competitive program will be staged at the speedway on July 4.

An invitation meet on September 4 will end the Des Moines speedway program for the year. This will be in celebration of Labor day, which falls on that date. The starts will be limited to six in number and invitations will be issued only to drivers who shall have finished first or second in races on the American Association speedway circuit for the season of 1916.

#### IMPORTS GRAND PRIX DELAGES

New York, March 14.—Harry Harkness, the New York sportsman, has purchased the three Delage cars which were driven by Duray, Bablot, and Guyot in the French Grand Prix at Lyons in 1914. The three cars arrived in New York last week and are now being fitted with new bodies better suited to speedway conditions than the original equipment. They will be campaigned under the management of Carl Limberg. This team ought to be one of the most important that will compete in America this year as the cars are practically new, having run in one race only.

The motors are peculiar in that the valves are operated positively in both di-

rections, being closed by the cam as well as opened. In the Grand Prix the Delage cars did not do very well owing to some unfortunate adjustment having been made the night before the race. Bablot held the record for a lap over the Lyons circuit in practice spins previous to the race, and it was the general opinion amongst French sportsmen that the Delage cars were faster than the Peugeot.

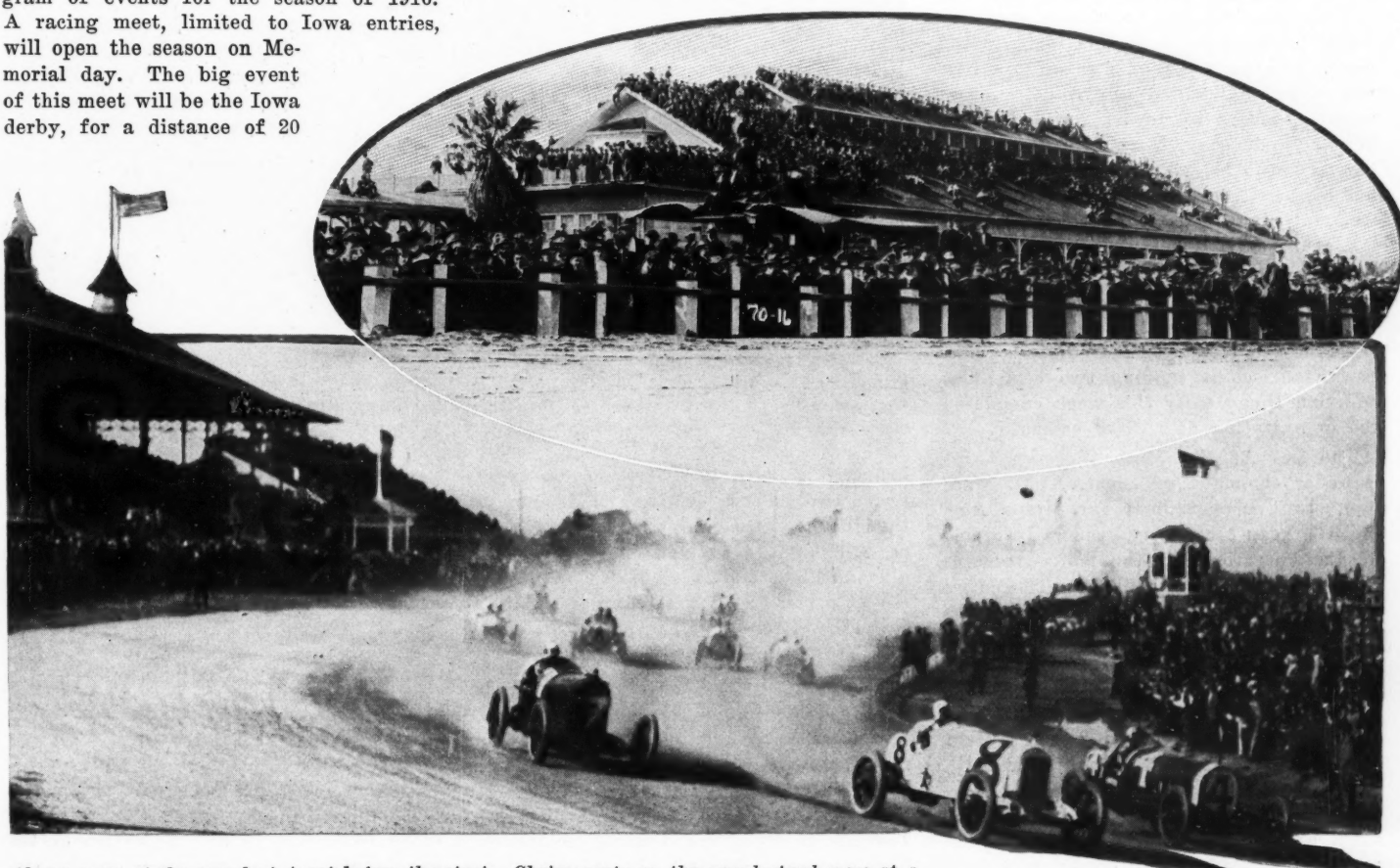
There is no doubt whatever that if the three cars had shown the same form in the race that they had already exhibited in the previous practice trials that it would have been possible to push the victorious Mercedes very hard indeed. Limberg is to drive one car. The other drivers have not been selected.

#### 70 M. P. H. TO QUALIFY

Chicago, March 13—So many have asked for entry blanks for the Chicago amateur drivers' race to be held May 20, that eliminations will be necessary, and to weed out the slower machines the committee in charge has set 70 miles per hour as the mark every car must make in order to qualify. It is believed that there will be at least fifty entries.

#### MOROSS TO SOUTH AMERICA

Chicago, March 13—After a rather long sojourn in South America, E. A. Moross, Detroit, Mich., has announced that Latin America is ripe for racing and that he intends taking a racing team south of the equator soon. The racing contingent will go by way of Cuba and Panama.



Above, some of the crowd at Ascot before the start. Choice seats on the grand stand were at a premium. Below, just after they got the starting flag at Ascot. Eddie Pullen on the pole set the pace on the lap to the flying start



*Los Angeles Motor Reserve machine gun company in action on rifle range*

## Motor Reserve Corps Joins Funston's Fighters at Border

Los Angeles Battery Under Lieut. A. I. G. Waddell Is First Volunteer Body Called Into Action by U. S. War Office

By Lieutenant A. I. G. Waddell

Motor Age's Correspondent with Mexico Expedition

LOS ANGELES, March 14—Special telegram—The efficiency of American motor car reserves in actual service is to have its first test on the Mexican border. Volunteers in the Los Angeles Motor Reserve Corps and the recruits in newly organized corps this week are to have a chance to show what they can do, as quickly as things begin to happen, after Uncle Sam gets into action down Mexico way.

The first call for volunteers sent out from Washington, came this week to the motor reserve corps of California cities, while the well-drilled Los Angeles corps received notice to depart for the Texas border Wednesday, March 15. These are the men who belong to the battery which has been getting in trim for military service, and staging practice maneuvers and trial runs in the vicinity of Los Angeles and San Diego in the last few weeks.

In addition, two full companies of touring car reserves have been recruited in Los Angeles, ready for immediate service. San Francisco is sending two companies and San Diego early this week completed the organization of a fifth company.

The Los Angeles Motor Reserve Corps is under command of Lieut. A. I. G. Waddell, staff correspondent for Motor Age. He will keep Motor Age readers informed of the operations of the motor reserves during the Mexico expedition. The entire body of motor reserves will go into the field under command of Capt. H. D. Ryus, winner of the first Phoenix road race.

The corps which Lieut. Waddell leads is the first volunteer motor reserve organized in the United States. In recent maneuvers it was shown that a field artillery train composed of four 2½-ton Moreland, worm-drive trucks, the type so far used, are equal to 50 cavalry horses in moving equipment, not considering that they will cover as much ground in a half-



*Target practice at night with machine guns mounted on Moreland motor truck. Truck furnished by First Truck Company, California Section Automobile Reserve Corps. Machine Gun Co., Seventh Infantry, N. G. C., commanded by Capt. Frank C. Prescott. This is the first time in America that machine guns ever fired from special mount, rigged on motor vehicle*

hour's time as a troop train could cover in a hard day's driving. It looks as though Gen. Francisco Villa's sharpshooters will have to contend with a considerable amount of dust when the motor artillery drives in their direction, especially since the government has placed an order for fifty-four new trucks with the Moreland company.

Watt L. Moreland, manager of the Moreland factory, is himself a private in the motor reserve corps, and has been present at the practice expeditions. He will also furnish fifty-four expert drivers. The men in all of the volunteer companies have undergone a rigid physical examination. Before the truck drivers are ac-

cepted for service the officers examine them in the operation of the trucks.

A 3-inch field gun and twenty men were carried on each of the four trucks which recently made the 132-mile run from Los Angeles to San Diego, and a complete field battery, consisting of the gun, shells and battery wagon, weighing more than 4 tons all told, was transported as well. The gun and caisson was trailed behind one of the trucks.

There were 273 applications for places in the command of fifty-four men scheduled to leave for the Mexican border to drive motor trucks in the service of the quartermaster's department as civilian employees today. The men had to be able to



drive a Moreland truck and make ordinary repairs and be physically fit for army service.

Many members of the motor reserve are owners of passenger cars and not capable of handling a truck under such conditions. When it was announced that there were vacancies in the truck detachment, there was a flood of applications. Many of the prominent young men of the city signed up for the service on the border and the body now ready to go to the front as truck drivers certainly will be a credit to the motor organization. Each man was required to fill out an application similar to that used for enlistment in the regular or volunteer service. After being physically examined, each applicant was examined by a truck expert and then rated according to his fitness, in the opinion of motor reserve officers, for service.

#### Preparedness Their Motto

No call has been made for cars, but the officers of the motor reserve of Los Angeles are expecting a call for machines and are prepared to offer cars with competent drivers at an hour's notice.

Prominent dealers of the city who are members of the reserve have sent out form letters to all their owners, listing them for service. These forms contain all necessary information regarding car, driver, experience, driving and mechanical military training and ability to use arms. These owners are grouped into companies with cars of the same make and model only being seen in each command. The adjutant of the organization has these records on file in the office of the commanding officer who is a former officer of the regular army and now an enthusiastic motorist and prominent business man of Los Angeles. On short notice it would be possible for Los Angeles to furnish 500 cars and drivers fit for military service. The Moreland factory offers to turn over more of its trucks to the government.

## Mexico Motor Campaign

### Gasoline Trucks and Transports to Follow the Columns in Pursuit of Villa

#### Caterpillars to Draw Siege Guns if Included in Expedition

FORT LEAVENWORTH, Kan., March 13—The motor truck will play a large part in the pursuit of Villa and his raiders by the soldiers of this country. Modern methods of army transport and supply will be used almost entirely, officers stationed here said today, and the old standby, the army mule that has made Missouri famous in every war of late years, will give way in a large measure to the motor, except in the case of the Fourth Field Artillery, whose mountain guns are carried on mules.

In recent years the roads of northern Mexico have been extended and improved greatly. American business representatives—miners and ranchers—have seen to that and, as a result, the movement of supplies by motor transfer is possible far into the interior. However, there are certain parts of the mountainous territory in which Villa probably will hide that army officers believe are impassable for anything except the mule.

#### Missouri Red Cross Motorized

Kansas City, Mo., March 13—The hospital corps of the Missouri National Guard will be motorized. A campaign was started here last week by the fifty members of the squad to raise \$10,000 to be used in purchasing motors to supplant the ten mule-drawn ambulances that now are a part of the corps equipment. Tests made by the corps have shown that motors will handle from three to five times the number of wounded men that mule-drawn vehicles will and, since the corps has volun-

teered for service in Mexico, the motorization will be rushed as much as is possible.

The campaign this year will be unlike other expeditions when the American troops went into the border country. At the time they went after Geronimo 30 and 40 years ago, into the desert country, the troops were poorly equipped and poorly supplied for operations into such country. The infantrymen sometimes returned to their posts with their clothing almost completely torn off from contact with cactus and sage brush. Often they were hungry and frequently suffered from thirst. It's a long way between waterholes in northern Mexico.

This time, motor trucks and transport will follow each of the three columns it is planned to send after the raider. They will carry water and coal for campfire purposes, a need that is apparent in the mountainous country. Extra supplies of heavy clothing will be carried. The high mesas of Chihuahua and Sonora are notable for their cold nights.

The signal corps of the army depends largely on the use of motor trucks in carrying its equipment. One of the recent signal corps innovations is the arrangement upon a motor truck of a collapsible radio apparatus with a sending and receiving capacity up to at least 200 miles, if not more.

#### Caterpillar Tractors for Big Guns

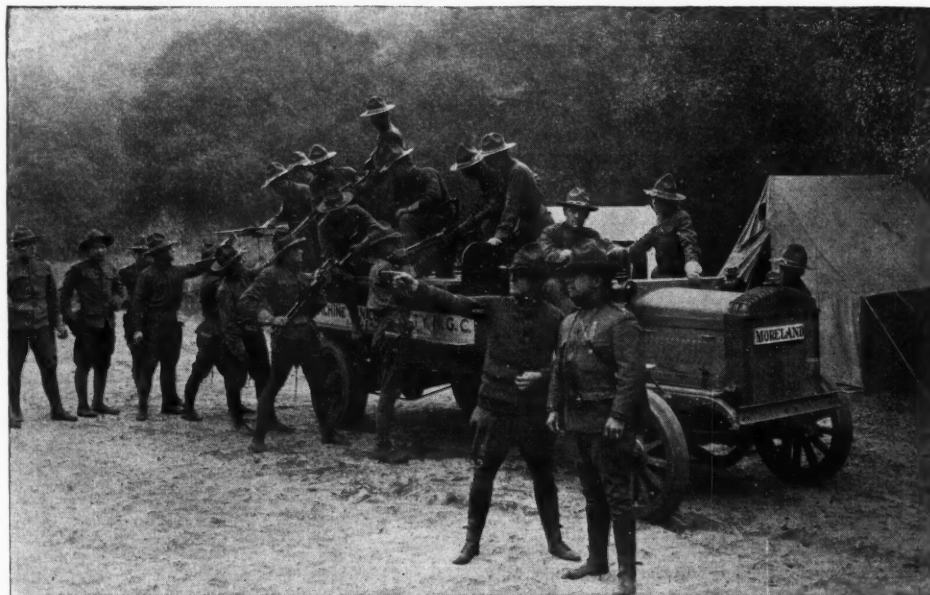
Fort Sill, Okla., March 11—Following recent tests with tractors in transporting heavy artillery, the announcement was made here this week that the siege guns attached to forces here would hereafter be drawn by caterpillar tractors. It is considered doubtful that this portion of the artillery will be taken to Mexico, but orders have been received from Washington to be ready for any eventuality, and if it is necessary to take the big guns against Mexico they will be transported by motors from the railroad base.

#### TO THE FRONT IN TAXICABS

Chicago, March 14—He who rides in taxis in Chicago will be right at home in Mexico in the event that hostilities break out and he volunteers for service. When he marches over the cactus trails of Mexico he will see the familiar yellow taxicabs of Chicago just the same. The Yellow Cab Co., whose machines are the color of the company's name, has offered the use of its taxis for military purposes.

The following letter has been sent to Adj. Gen. McCaine at Washington by John Hertz, manager of the company:

"Dear Sir: Some time ago we offered our entire equipment of taxicabs to be used for mobilizing troops. We thought at this time that you could use them on the Mexican border for patrol and mobilizing purposes. All our chauffeurs have volunteered to drive and care for cars. If you can use the 200 cars and men, please let us hear from you, so that we can get them ready for transportation."



Field practice of First Motor Truck Co., Los Angeles Motor Reserve Corps and Machine Gun Co., Seventh Infantry, N. G. C.

# SIGNS



The Daughters of the American Revolution have laid aside funds to be used in marking old-trail roads. The colors of the signs are red, white and blue, and like the Lincoln highway markers, are painted upon telephone poles. The D. A. R. fund does not furnish money for improving roads, but merely for marking the old pioneer roads. A more commendable or more desirable undertaking could scarcely be conceived by a patriotic organization whose purpose is to cherish and preserve those things that are of such historic interest as the Old Trails

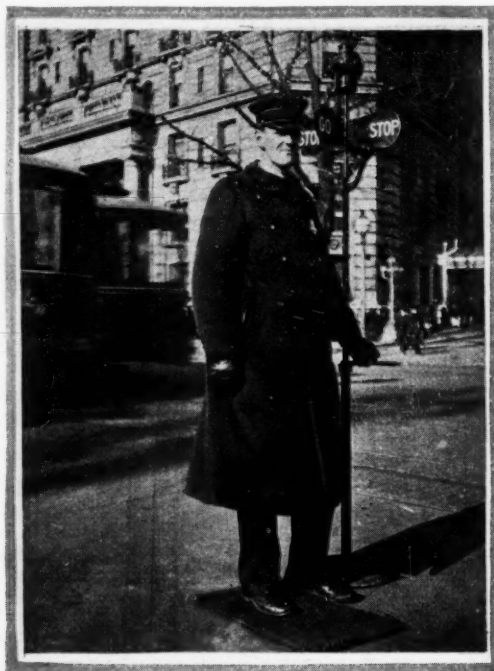


Various states have taken to marking the approaches to what may be considered dangerous places on state highways. By offering a reward for information regarding the removal of or injury to the sign, the motoring public is assured a permanent protection. Such posting of dangerous places should be encouraged and given substantial aid and cooperation by local organizations, individuals and county authorities. Motorists cannot fail to appreciate the worth of such signs



If this admirable paraphrase of the Golden Rule were followed, defective mechanism would have to shoulder the blame for the majority of accidents of every description

DO you believe in signs—signs of weather, or signs of traffic? If the latter, you are a dispenser of gas, and advancer of the spark. Then heed the warnings of our little dumb friends—the signs, or something worse than the goblins'll git yer if yer don't watch out! Signs are of many characters and convey a variety of messages to the motorist. Some are warnings, some are commands and some friendly notices that he is on the right road.



An effective sign, manipulated by an officer of the law of such a splendid height that he can miss nothing he should see in the congested traffic. It is surmounted by a lamp which shines red when the semaphore signals "stop" and green or white for "go ahead"



A sign of this type is of value to a stranger in a large city. Just where to put a car in the congested shopping district is always a problem—to say nothing of where not to put one



This is a familiar sign to motorists, and needs no comment—only heeding. More deaths and accidents result from trespassing on railroad tracks than all other casualties combined. Fatalities of this sort in the United States greatly exceed those in foreign countries



This appears as a red-and-white sign, marking a dangerous curve. It is very neat, attractive and concise, is easily read, and doubtless prevents many a mishap

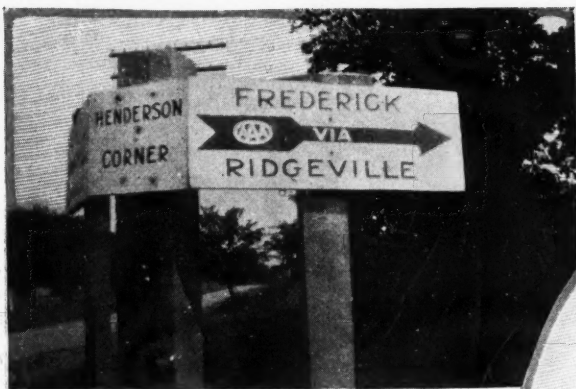


This is an excellent warning, as it appears at the entrance of a viaduct which opens out flush with a car track. As it is impossible to see an approaching car, a word of warning at this point is decidedly beneficial



This sign certainly lends force to the old maxim—that "Ignorance of the law is no excuse"





An official American Automobile Association marker which is doing good work at a corner along a Lincoln highway feeder, which would otherwise be misleading



In the state of Maryland, it is a law for all incorporated towns to post their respective speed limits on the right-hand side of the roadway at the corporation line. This is to warn the visiting motorist of the "town's speed." Maryland enforces this law, so heed Maryland corporation markers, as each has its own speed regulations



This is a universal railroad crossing sign, and if heeded will prevent accidents. If you STOP, then LOOK, and then LISTEN, you will never have cause to regret. These three simple words were given the Grand Prize offered by a joint railroad committee for the best warning given in the least words, and in the simplest and most emphatic manner. STOP, LOOK and LISTEN, remembering that it is a railroad crossing



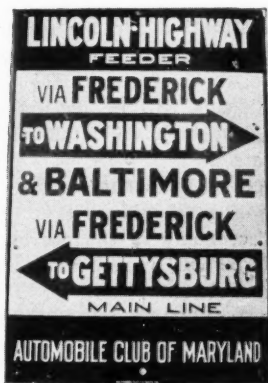
This is one of the real joy signs of motoring—to know that you may go—go a little—and that the country is at least "open." This sign may possibly mislead one who is not a prohibitionist, for the open condition noted relates only to the roads



Both warnings on this sign, which appears near a turn in the road, are good. The motorist who heeds saves his fellow-man and himself



These life buoys are located along the speed-way of one of our larger eastern cities. A good idea, inasmuch as several cars have gone over the sea-wall, and their occupants were hauled ashore, with the aid of these canvas doughnuts



The Lincoln highway does not pass through Maryland, but the state has many excellent feeders, and the Maryland Automobile Club has equipped these motor paths with very durable enameled signs



This type of sign gives more than one piece of information—it gives the name of the road you are on, the speed limit, and the miles to and from the respective terminals of the road

**CAUTION  
SHARP CURVE  
AHEAD**

Most of the parks have adopted signs marking their curves. Although these signs answer the purpose, they could be improved upon by being made artistic. While they warn, they should at the same time be in harmony with their surroundings lest the esthetic sense be offended



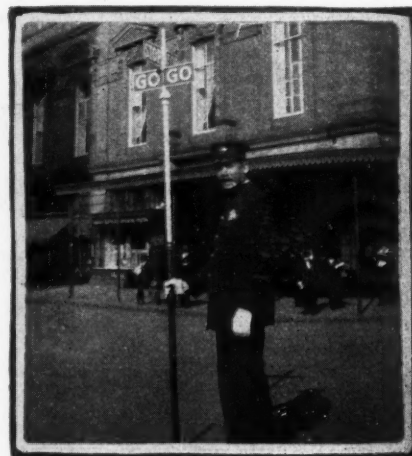
One of "Philadelphia's Finest" on traffic duty. Just over his head will be noted the famous "L" blue and white Lincoln highway marker

**← SPRING**

The sign of spring is always greeted with pleasure by those who motor. This sign will not interest those who have fallen from the water wagon. It is a long road, however, like the road without a turning, that has not an occasional sign like this, even for those with the trait which distinguishes the camel



An effective one-target sign that does good service at a busy crossing. Formerly such crossings were controlled by the blowing of a whistle. Experimentation proved, however, the immense superiority of the sign over the whistle, owing to the difficulty of the latter being heard above the din of the street. Unnecessary confusion is caused at crowded corners where whistles instead of semaphores are still depended upon for controlling traffic, since there are many who use their eyes rather than their ears and wait too long or proceed too soon



The much-ridiculed "Go-Go" sign, commonly dubbed "Goo-Goo"—but a great aid in traffic. Fewer drivers proceed by mistake after the officer signals "stop"

## Economy Urged in the Use of Gasoline to Solve Problem

### Oil Men Tell How to Save Fuel—Different Ways of Making Product Go Farther Are Advanced

REPRESENTATIVES of both the Standard Oil and the independents declare it a certainty that gasoline will continue to rise. A man who is at the head of one of independent companies and formerly an officer in the Standard Oil organization, remarks that if anyone doubts that a further rise in prices is just ahead, he need only observe that the producers are throwing all remaining ballast overboard by disposing of millions of barrels of oil which has been held in storage in the Oklahoma fields, due to accumulation of a surplus in years back when over-production was the rule.

"Taking into consideration the large exports of gasoline as a result of the war," he says, "and the fact that a steady increase occurs every month in our home consumption; remembering also that the wells are yielding less oil, and presuming that we may expect a large annual rate of increase in the home consumption as in the past, there is only one thing that can be said: The wells cannot keep up a flow great enough to meet the demand. It is

a serious situation for the motor car industry as well as for the petroleum industry. True, there is always the possibility that new fields will be discovered. But we must deal with the situation that already exists."

#### Three Ways to Economize

In answer to a request that he outline a plan of economy in the use of gasoline by individual car owners and large companies with twenty, fifty or 100 motor trucks in service, his reply was this:

"There are two means of economizing and I think they will be recognized by car owners through force of necessity:

"First—There should be less gasoline consumed merely for pleasure riding. I say this considerably, though I am aware that motor car manufacturers will not relish my statement. The consumption of gasoline, coupled with the question of supply and demand, has an economic aspect that makes it a national problem.

"Second—Car owners have got to get down to the matter of dollars and

cents. We must expect economy to begin here.

"Second—We must find substitutes for gasoline wherever possible, as in the use of kerosene in combustion engines."

Not a cheerful outlook, the motor-car man will say. A little different from this is the comment of the independent producer, once a Standard Oil official himself. The old grievances of the independents crop up again, for they want it known that their refineries in the southern fields are actually selling gasoline at a loss, even if they receive for gasoline at wholesale the amount of the retail prices now prevailing in the Middle West and the central states.

Jobbers who depend on them for their supply must share the loss, or admit themselves beaten in a fight which, according to the independent producer, is a revival, or continuation, of the old feud between Standard Oil and the independent interests. He makes the assertion, then supplies the explanation which it seems to demand.



"It is altogether a question of supply and demand," he explains. A simple enough matter it would seem from this, until he points to the follies of the oil industry which he believes have been the contributing factors in making the matter extremely complex,—follies of rash competition which he blames for the high prices today.

"For a while after the discovery of the big producing wells in the Cushing district in Oklahoma," he says, "there was an over-production of crude oil. Where before we had been producing 50,000 barrels per day, a flow of approximately 300,000 barrels per day became the rule. Oil is not like copper or iron, or coal. When there is over-production of these commodities, the tonnage of the mines can be curtailed. But the flow of oil cannot be controlled. Oil must be stored.

"The large flow resulted, therefore, in millions of barrels of oil being stored in tanks and pipe lines. Gasoline was cheap and was selling for as low as 8½ cents. The producers sold as much of the surplus as possible in the form of fuel oils and burning oils. But a vast amount of crude oil accumulated in the tanks. There was said to be 80,000,000 barrels in storage a few weeks ago, and it has been said by some that prices have been forced up by the storing of so much oil. But this could hardly be true.

"The condition that brought about over-production is the same that has brought on the existing high prices of gasoline. Too many wells were drilled. Every time a good well was brought in the competing interests in the field would put down a well, or wells, as close adjoining it as possible. The competition forced them to do so in self-protection. Sometimes it meant that three or four wells were drilled where only one should have been. This not only caused an aggregate flow far in excess of that demanded, it exhausted the pools of oil too rapidly also, until today the flow has been considerably lessened. Consequently, instead of over-production, there is a shortage."

#### TRY OUT RITTMAN PROCESS

Long Beach, Cal., March 11—The first refining company to apply to the government for permission to use the Rittman process of refining gasoline is the Independent Oil Producers' Agency.

At present agency members produce large quantities of low-gravity crude oil, which, under the refining methods now employed, yields very little gasoline. With the Rittman process it is believed that a yield of motor spirits equivalent to gasoline, running as high as 80 per cent in distillants, may be obtained from the crude oil. The actual cost of producing the gasoline is estimated at 1 cent per gallon, exclusive of the cost of the oil from which it is extracted. The officials of the Independent agency expect that they will be able to retail gasoline in California for less than 10 cents per gallon.

## Lane Blames Refiners

### Secretary of Interior Lays Before Congress Gasoline Data and Recommendations

#### Urges Use of Carbureters Designed to Utilize Heavier Oils

WASHINGTON, D. C., March 12—Congress has in hand the report of Secretary of the Interior Lane containing an analysis of gasoline and crude oil production and distribution in the United States. The report, just issued, was prepared in response to a resolution adopted in January, calling upon Secretary Lane to submit all available data bearing on the production, consumption and price of gasoline.

Important in the solution of the problem, according to Secretary Lane, is the use of improved types of carbureters which will permit the use of heavier oils and substitutes for gasoline.

The opinion is expressed in the report that increasing profits have resulted among the larger refining corporations as a result of the upward trend of prices, and that this is one of the tendencies which has contributed to the steady rise in prices. The report then states that prices consequently are less directly related to the actual supply of crude oil than might otherwise be the case. Secretary Lane says in part:

The obvious fact is that the refining and transportation companies that are strongest in business foresight and financial backing take advantage of both the falling and the rising markets in crude oil to strengthen an already strong position by purchasing both stocks of crude and producing properties. Under these conditions a market shortage of crude may develop which is not wholly warranted by facts of actual production, yet it no less surely leads to higher prices in both crude and refined products. This furnishes the opportunity for the well-supplied refiners to sell at the higher price gasoline which is derived from crude oil purchased in a lower market.

#### GASOLINE SELLING HIGHER

Chicago, Ill., March 14—Again the price of crude oil at the wells in Oklahoma and Kansas has climbed several notches. In the last week a raise of 5 cents per barrel was announced by refineries controlled by independent companies, this increase following upon a 10-cent jump during the previous week, from \$1.30 to \$1.40 per barrel, an increase first put into effect by one of the companies of the Standard Oil group. The latter company has not met the last increase to \$1.45, though representatives of other Standard Oil companies, in summing up the situation in the Chicago market, state that the Standard refineries probably will announce a corresponding increase.

The new quotation of \$1.45 per barrel is the high mark of the Mid-Continent field. Several companies are paying premiums over the posted price of from 30 cents to 45 cents per barrel. As yet the 5-cent increase of this week has not affected retail

prices for gasoline in cities supplied from the Mid-Continent field.

Chicago prices have remained the same for a week, gasoline now retailing at from 20½ cents to 22 and 23 cents.

Gasoline rose another cent a gallon to 18.8 cents in Kansas City, Mo., last week. That price was posted by the independent companies and was followed immediately by an advance by the Standard of a similar amount to 17.8 cents. The Standard for several weeks has been charging a cent less than the independents.

There has been no increase in the East since March 2, when the price went up a cent to 24 cents, in New York, and to 23 cents in Jersey City, N. J. Connecticut pays 24 cents and Boston, Mass., 25 cents.

A 2-cent increase went into effect in Dallas, Tex., last week. For several weeks the price has been 21 cents; now it is 23 cents, which is the highest price on record in that section. A number of jitneys in the smaller Texas towns have been laid up because of the expense of fuel, and in the larger towns and cities it is feared that the jitney business is doomed if gasoline does not come down. Nothing has been heard recently of the investigation proposed by the Texas attorney general's department.

The Atlantic Refining Co. has advanced the price in Pittsburgh 1 cent from 24 cents to 25 cents per gallon, tank wagon basis, and the same advance has been made in Philadelphia—from 24 cents to 25 cents. In Memphis, Tenn., where the price has been 20 cents for some time, there has been a 1-cent increase to 21 cents.

#### Shortage in Georgia

Throughout southern California the price has remained unchanged for more than two weeks and motorists have taken it for granted that the mark of 18 cents per gallon at Los Angeles is the high water mark, that is for that section. In San Diego and other localities in that part of the state the price is a half cent higher.

T. M. Hoynes, manager of the Savannah branch of the Standard Oil Co., is authority for the statement that owners of motor cars and motor trucks will undoubtedly be paying 40 cents per gallon, wholesale, for gasoline by the end of spring, with every prospect of an increase to 50 cents.

He estimates that there is less than 1,000 barrels in Savannah at the present time. He has been notified that a shipment of 27,000 barrels, which he is to receive shortly, will be the last shipment to Savannah by the Standard Oil Co. until some time in July. Savannah is the distributing point for Georgia, and these 27,000 barrels must be scattered over the entire state, meaning that a close margin will prevail between supply and demand.

The wholesale price now stands at 23½ cents. Already some owners are using a mixture of gasoline and kerosene in their cars, and if the price keeps on soaring they will probably have to use kerosene altogether.

## Congress Heeds Motorists

### Gasoline Problem Given Serious Thought; Action Promised Before Adjournment

#### Agitation and Complaints from All Sections Hasten a Solution

WASHINGTON, D. C., March 11—Federal activities to determine causes for the high prices of gasoline and to effect reduction may be briefly summed up as follows:

Federal trade commission is making a thorough investigation of facts, considering this the most important work before them. The commission will make a report before congress adjourns.

The director of mines states that the Rittman process was offered free to all producers and refused on account of a clause which prevented monopoly.

The bureau of mines has issued a bulletin describing the Rittman process to minimize the cost of refining.

Representative Steenerson is drafting a new bill to present to congress which he says will "prevent the high cost of gasoline."

Representative Randell of California, who has asked Henry Ford's coöperation, advocates an embargo on gasoline.

The collection of statistics concerning the production and use of gasoline is asked for in a bill introduced in the House by Representative Carter of Oklahoma. The bill would authorize the director of the bureau of mines to collect and publish the statistics, which should include facts concerning the production of crude petroleum, as well as facts concerning its manufacture into gasoline, and the best obtainable facts concerning the marketing of gasoline.

#### PETROLEUM ABUNDANT IN SHALE

Washington, D. C., March 13—According to a report made public today by the United States Geological Survey, an almost inexhaustible supply of oil may be obtained from the shale of northwestern Colorado, northeastern Utah and southwestern Wyoming. This shale contains materials which, when heated, may be converted into crude oil, gas and ammonia. The high cost of distilling oil from shale as compared to the cost of producing oil from wells has thus far prevented the development in this country of such an industry and may continue to prevent it for some time, but sooner or later this great source of supply will be utilized to supplement the decreasing production from the regular oil fields.

According to the geological survey report, the oil derived from the shale is similar to that which is being produced from wells in the United States at the rate of more than 250,000,000 barrels a

year. When refined by ordinary methods the shale oil yields an average of about 10 per cent gasoline, 35 per cent kerosene, and a large amount of paraffin. The yield of gasoline from the shale may probably be largely increased by the use of refining methods especially designed for that purpose. The gas, which is a very good illuminating gas, will perhaps be sufficient to furnish all the heat required to distill the crude oil from the shale.

#### DALLAS TAKES A HAND IN INQUIRY

Dallas, Texas, March 11—Working through Congressman Sumners, of Texas, the Dallas Auto and Accessory Dealers' Association has begun a fight to carry onto the floor of congress the investigation of the high price of gasoline. This action was started today when gas jumped from 21 cents to 23 cents per gallon. The dealers' association heard a message today on the proposition from W. M. Freeman, the geologist. This investigation, Dallas dealers believe, will greatly reduce the price of gas.

#### BAN ON PLEASURE MOTORING

London, Eng., Feb. 18—The extinction of all private motoring in England is threatened by a recommendation of the National Organizing Committee for War Savings that pleasure motoring should not be indulged in. The committee states that this is a selfish and thoughtless form of extravagance affecting:

1—Ships and men now employed in carrying oil and rubber for motor cars and bicycles.

2—Men at docks and railroads, carmen, etc., employed in handling these cargoes and in work connected with the importation of motor cars and bicycles.

3—Chauffeurs now engaged in driving and looking after motor cars.

4—Men now engaged at garages and shops all over the country repairing cars and bicycles.

5—Men engaged in the manufacture and handling of tires used on cars.

At present the move is nothing more than a recommendation, but an endeavor is being made to put a stop to all pleasure motoring by reason of a special tax on gasoline. It is hinted that gasoline, which now costs 50 cents a gallon, will be raised to \$1. Many of the daily newspapers are clamoring for this measure in order to put a stop to what they claim is a useless extravagance.

Much use is being made of the claim that pleasure motoring has been forbidden in France and should be tabooed in England also. This is quite incorrect, for, although nobody can use motor cars in France without a special police pass renewable monthly; this pass is given to everybody of recognized reliability irrespective of what kind of service the car may be intended to perform. The measure is only a precaution against the use of cars by spies, criminals or suspected persons.

## Ford Tackles Gasoline

### Quickest Way to Reduce Prices Is Best Way, He Tells Congressman Randell

#### Rittman Process May Be Given Test by His Experts at Once

WASHINGTON, D. C., March 14—Henry Ford will get into the fight on the high cost of gasoline. This announcement was made today by Congressman Randell of California, who appealed to the manufacturers to aid in promulgating processes for cheaper production of gasoline. Ford believes the Rittman process will result in a greatly reduced cost to the consumer. Rittman is now experimenting with another process to produce more gasoline from ekrosene. Mr. Ford, in a letter to Randell, wrote as follows:

"The solution of the gasoline problem is an urgent matter. If one attempt fails the quickest way to get a solution will be to commence with another one, although I may not be able to take up the Rittman process at once. In response to the appeal of Congressman Randell, after the present tests by Rittman are completed, I may go into it thoroughly."

#### LAMP MAKERS MERGING

Detroit, March 13—While negotiations are pending between the Edmunds & Jones Mfg. Co., motor car lamp makers here, the Canadian Lamp & Stamping Co., Walkerville, Ont., and the Chicago Electrical Mfg. Co., Chicago, with the object of a merger which is to be eventually named the Edmunds & Jones Corp., George E. Edmunds, secretary-treasurer of the Edmunds & Jones Mfg. Co., states that the deal has not yet been completed, and that statements published locally regarding the combine are as yet premature.

Local financial circles have it that a syndicate of New York brokerage houses, consisting of Hornblower & Weeks; White, Weld & Co., and Merrill, Lynch & Co., are offering participation in the marketing of \$1,000,000 in 7 per cent cumulative preferred stock and 40,000 shares of common stock which may go on sale at \$40 a share, and which is to constitute the capital stock of the new corporation.

#### EXTEND TIME PAYMENT PLAN

New York, March 13—The Guaranty Securities Co., Toledo, through which the Willys-Overland Co. a short time ago completed arrangements for the disposal by its dealers of cars on the time-payment plan, is about to be reorganized and its scope of operations greatly increased. Under the reorganization plan, the company will be known as the Guaranty Securities Corp. and will be prepared to handle time-payment business for the dealers of some twenty different manufacturers. The system under which the corporation will oper-



ate is somewhat similar to the general plan outlined in Motor Age for March 1, there being no expense to the dealer. The various manufacturers are not parties to any agreements. The plan will be placed before the general public early in April through a national advertising campaign.

#### MILWAUKEE EXHIBIT IN APRIL

Milwaukee, Wis., March 13—The Milwaukee Automobile Dealers, Inc., has selected Friday, Saturday and Sunday, April 14, 15 and 16, as the dates for the second annual spring show, a garage-circuit exposition originated by the Milwaukee dealers and put on with great success in April a year ago.

For the spring show, which now ranks with the annual winter show in the Auditorium and the fall show at the Wisconsin state fair, each dealer will dress up his garage and salesrooms in true show style and display the latest models from the factories. Each dealer will provide cars for the free transportation of visitors from his garage to the next so that all the leading makes may be inspected just as if they were displayed collectively under one roof.

#### LEXINGTON, KENTUCKY SHOW

Lexington, Ky., March 13—At a recent meeting held by the merchants and motor car dealers, Lexington, Ky., several weeks of consistent effort on their part bore fruit and as a result plans for a big motor car style show are being pushed.

Plans for a motor exhibit have been considered for some time, but because of the fact that the quarters available, up to a recent date, were not sufficiently large to stage a first class show, a number of the dealers were in favor of abandoning the idea altogether, while a number of others firmly believed that a fairly good exhibit would be much better than none at all.

For a time it seemed that uniting the two factions would be a hopeless task, but the Lexington motor dealers found a way which would enable them to put on a show promising to rank well with the efforts of much larger cities along this one line of endeavor.

#### NEW ORLEANS SHOW PLEASES

New Orleans, La., March 13—The most successful motor car show in the history of New Orleans was brought to a close here Sunday night, after a 4-day exhibit, viewed by upwards of 10,000 persons. Twenty-three concerns, exhibiting 125 cars, occupied to 50,000 square feet of floor space in the Washington Artillery Hall, exclusive of the exhibits of accessories. These exhibitors, and the directors of the New Orleans Automobile Dealers' Association, under whose auspices the show was given, are elated over the success of the exhibition, which, they declare, will result in an increase of 33 per cent in the season's sales.

## Want Show Extension Boston Dealers Ask to Put Closing Date 3 Days Away, but Are Turned Down

Some Exhibits Have to Go Else-  
where Is Reason Given

BOSTON, Mass., March 12—So successful was the Boston show that last night, in response to a request from some of the dealers, the directors of the Boston Automobile Dealers' Association met to consider the question of continuing the show for 3 days next week. The exhibition aroused so much enthusiasm that the movement to add on a few days was talked about and then it took shape when dealers put it up to the association for a vote. Manager Chester I. Campbell went to the owners of Mechanics' building and asked for an offer on the price and got it. Then the matter was threshed out at the meeting of directors. It was voted down.

There were some 425 cars in the building. Of that number approximately 5 per cent were sold before the show opened and so were there by the kindness of the owners. That reduced the unsold cars to just above 400. About every car in the show was sold, and the average price of the cars was placed at \$1,000, so there totaled \$400,000 for the machines. That does not include all the sales booked. Space Rent Returned

The attendance was about 225,000. Of that number there were perhaps 50 per cent who came in on dealers' tickets. The first 200 tickets given to dealers cost each one the regular price of 50 cents each. All after that cost each dealer 25 cents. So the gate receipts totaled more than \$65,000. It was a bad week for weather. With the exception of the last day there was snow day after day. Had it not been for that the attendance would have run to 275,000 easily. As the show space sells for \$1 a square foot and there was 105,000 square feet sold that gave the association approximately \$175,000 before the show opened. The expenses of running the show is covered by the gate receipts. So all the members of the dealers association get back 100 per cent on their investment after the show in the first dividend, in other words they get back exactly what their spaces cost. Later on there is another dividend but what it is no one knows outside the association. Those not members of the association do not get their money back, however.

All told there were more than 3,000 dealers at the show. And they came from far away points. Presque Isle and Fort Fairfield, the northern points of Maine, had several dealers. Colebrook, Berlin and other northern New Hampshire points were represented. Montpelier, Newport and northern Vermont, Pittsfield in west Massachusetts; Connecticut and Rhode Island

all sent their full quota. There was no city without several and every little town had one or two. There were a number of agencies placed and the fellows who had new cars were amazed at the interest shown in their product.

#### JACKSONVILLE SHOW FLORIDA'S

Jacksonville, Fla., March 10—Florida's first motor show, with thirty-four different makes of cars and trucks, closed tonight in this city. Success marked it from every viewpoint and it was in many ways a stimulant for business in the southeast. The show opened on March 5 and was held in a specially-constructed building in Confederate park, making it the first outdoor show of 1916.

The biggest season in this state for motor car men is predicted by Florida bankers, who are very optimistic. At the present time there are many tourists in this state and in the local banks alone \$25,000,000 is on deposit. Business conditions have improved lately.

With only 14,000 cars in this state, the show naturally has increased interest in the motor car. Banks are not looking with as much disfavor as they did some time ago on the dealers' paper.

As to the demand in Jacksonville and the surrounding territory, the medium-priced car selling from \$800 to \$1,500 is most in demand. The local purchasing public is looking for power in its cars due to the heavy sands that must be negotiated.

#### MOBILE CARNIVAL GAS LIGHTED

Mobile, Ala., March 10—The first annual motor show of Mobile was opened on March 5, as part of the city's big Mardi Gras celebration. Hundreds of visitors for the festivities attended the show. The opening attendance was estimated at 10,000. The carnival colors mingled with the national colors in the decorations. In addition the dealers decorated their exhibits with the pennants of their cars.

The opening speech was delivered by Mayor Lyons. On the second and third nights the show was closed at 6 o'clock because of the Mardi Gras parades, but the remainder of the week it was open until 10:30 o'clock. Special nights were Society and Automobile Club nights.

An interesting feature was that the show was lighted with gas, only, being the first show to use this illumination.

#### CREAM CITY DEALERS PLAN SHOW

Milwaukee, Wis., March 13—The great success attending the first annual fall show of the Milwaukee Automobile Dealers, Inc., held in connection with the Wisconsin state fair last September, has resulted in the adoption of a plan for repeating the exposition under the same auspices during the 1916 state fair, September 11 to 16 inclusive. The M. A. D. has again leased Machinery hall at State fair park, in West Allis, a suburb of Milwaukee, and will provide a show rivaling the winter one.

# Plans for S. A. E. Summer Cruise Finished

## Will Include 4 Days on S. S. Noronic in Lake Huron and Adjoining Waters

**D**ETROIT, Mich., March 10—Complete arrangements for the midsummer cruise of the Society of Automobile Engineers, June 12-16, as evolved by the 1916 meetings committee, contemplate the most extensive summer outing the society has yet undertaken. The steamer Noronic, with accommodations for approximately 550, has been chartered and the 4-day cruise on Lake Huron and Georgian Bay embraces Mackinaw Island, Collins Inlet, and parts of the Thirty Thousand Islands, with a complete day given over to picnicking, fishing, and sightseeing through the island.

### 4-Day Cruise

The 4-day cruise starts from Detroit, Monday, June 12, at 2 p. m., and ends here Friday, June 16, at 6 p. m. The complete itinerary is:

Monday, June 12—Leave Detroit 2 p. m., eastern time.

Tuesday, June 13—Arrive Mackinaw island 11 a. m. Leave Mackinaw island 6 p. m.

Wednesday, June 14—Arrive Killarney, Ont., 7 a. m. Day given over to picnics, etc.

Thursday, June 15—Leave Killarney 5 a. m. Arrive Owens Sound, Ont., 3 p. m. Leave Owens Sound 7 p. m.

Friday, June 16—Arrive Detroit, 6 p. m.

Full details with regard to tickets, reservations, etc., on the Noronic for the 4 days have been concluded, and boat tickets including meals and berths in all state-rooms, ten parlors excepted, are \$35 each for all members. Guests are charged \$5 additional. Children between 5 and 12 years, \$17.50 each. The ten parlors which occupy the best positions on the Noronic, and afford special facilities, cost \$150 each, this including two tickets and meals, etc.

Entire charge of selling tickets and making reservations is in charge of the 1916 meetings committee, which has headquarters at 601 Kerr Building, Detroit, Mich., where W. H. Conant, treasurer of the committee, is in charge. All applications for reservations must be addressed to the S. A. E., at this address. Checks payable to the Society of Automobile Engineers must accompany all orders for tickets and reservations.

Last year the capacity of the Noronic was well taxed on the occasion of the midsummer S. A. E. session, but this year so great is the interest that it is expected the total accommodations of 550 will be reserved by May 1. In order that S. A. E. members may not be disappointed in securing space, their applications will receive first considerations, providing they are in the hands of the committee by May 1. Previous to this date applications will be considered in the following order: First, S. A. E. members and their families; second, applications of sectional associates; third, applications for guests of S. A. E. members; and fourth, applications for guests of sectional associates. Names must accompany all applications for tickets.

Already a tentative program for the 4-day session has been tentatively drafted by Chairman George H. Dunham and his associates. This program will give approximately the same time to professional sessions as last year, but will afford more opportunity for recreation. Three of the four evenings on the boat will be given over to entertainment furnished by the six sections of the society, to be followed by dancing. Only one evening, namely, Monday, will be devoted to a professional session.

In order to give all in the party aboard the Noronic an opportunity of becoming acquainted, a promenade will be held on the deck Monday afternoon, soon after sailing, and on Friday afternoon, previous to the party disembarking at Detroit, there will be an au revoir promenade.

Wednesday, June 14, should prove the greatest picnic day in S. A. E. records, as morning, afternoon and evening, will be given over to recreation. W. A. Brush, secretary of the 1916 meetings committee, and in charge of steamboat arrangements, has arranged with the Northern Navigation Co. to afford facilities for fishing, picnicking, and excursions through the islands. Provisions will be made so those desiring to charter motor boats and launches for the day can do so through the 1916 meetings committee.

### CLEVELAND SECTION ON GAS

Cleveland, O., March 11—The next meeting of the Cleveland section S. A. E., will be held at the City Club rooms, in Cleveland, March 17, at 8 o'clock. C. F. Kettering, vice-president and manager of the Dayton Engineering Laboratories Co., has promised a most interesting and instructive paper on the "Chemistry of Combustion." Mr. Kettering is an able speaker and has made a thorough study of this subject. That this will be of great importance to all engineers interested in internal combustion motor construction and design, goes without saying and a large attendance from other cities is expected.

### INDICT I. A. L. PRESIDENT

Uniontown, Pa., March 10—The grand jury has indicted A. C. Bidwell, president of the International Automobile League, Buffalo, N. Y., and two of its representatives, Harry Ames Van Auken and F. A. Chapman on charges of conspiracy and obtaining money under false pretences. Bidwell and Van Auken are at large, but Chapman is under arrest here and will come up for trial March 13.

The Standard Automobile Garage, this city, charges that Van Auken, exhibiting power of attorney signed by A. C. Bidwell and an Illinois Surety bond, agreed to furnish an Illinois Surety bond in the amount

the garage would pay for a jobbers' contract issued by the I. A. L. However, upon accepting the contract, which purported to enable the garage to purchase accessories and supplies at from 10 to 33½ per cent of the manufacturers' wholesale price, the bond which was returned was not an Illinois Surety bond, but a bond of the I. A. L. which was almost an exact imitation of an Illinois Surety bond in appearance and phraseology.

An investigation by the garage proved, it states, that the league has no contracts with manufacturers of standard supplies and accessories.

Richard H. Lee, chairman of the A. A. A. legislative board and president of the Cleveland, O., Automobile Club, states:

"Owing to the great number of individuals throughout the United States who have at one time or another contributed to the International Automobile League, Inc., Buffalo, N. Y., considerable interest will be displayed in developments at St. John, N. B., where two agents of the International named Harold Cottrell and Roy Grey, are under arrest charged with receiving money under false pretenses.

"The attorney general of New Brunswick, upon the opening of court, moved to have the prisoners who were represented by counsel, immediately enter pleas of guilty. They were not prosecuted on the other ten counts charged against them. The judge suspended the passing of any sentence and let the prisoners go on a recognizance of \$1,000 each and warned them that they must refrain from acting as agents of the league.

"The attorney general stated that he felt justified in taking this course in suspending the sentence, in view of the fact that the public welfare would be sufficiently served by preventing the operation of the International Automobile League of Buffalo in this territory; that although the prisoners had made improper and untrue representations, they were to a certain extent victims of the system pursued by the parent company at Buffalo for the purpose of getting money from the public without intention to give an honest return for it."

### ILLINOIS HAS SAFETY INSPECTORS

Bloomington, Ill., March 13—Lewis G. Stevenson, secretary of state, is appointing a motor car investigator in each county of the state. In the larger counties, two will be named. The position was created in the interest of safety and to provide an assistant for the state's attorney in suppressing the motor car scorecher. In most cities, the investigator is a dealer in cars or supplies and well posted on all phases of traffic laws. They will be empowered to enforce the state laws, regulating motor traffic, and can bring action to punish offenders. Examining chauffeurs, enforcing the license provisions of the act, and investigating accidents, also will be part of the duties of the new appointees. They are to serve without compensation.



# AUGUSTA GA. Hallowed by Memories of Two Wars



*St. Paul's church, site of Revolutionary fort*

WHEN the northern motorist tours through the south, he should permit his imagination to travel back over the trail to yesterday without restriction if he is to enjoy his pilgrimage to the fullest extent. He must look upon the Dixie of 50 and 100 years ago as well as study the Dixie of today, putting slaves in the cotton fields and making aristocratic gentlemen the masters of abandoned mansions and estates.

Especially is this true of the northern traveler who visits Augusta, Ga., and in his migrations about the city and its environs, goes to the lagoon, which, to my mind, is one of the most romantic spots in all the romantic south. It is one of the most famous duelling grounds in the country, a field of honor such as the scene painter for a Dumas melodrama would

## By J. C. Burton

make to give maximum realism to the play.

The lagoon lies on the banks of the Savannah river and in the old days, when it was the meeting place of aggrieved gentlemen who had personal differences to settle with derring or sword, was reached by means of a ferry which was the only crossing of the stream within a distance of 136 miles. The old ferry still is in operation, a relic of pre-bellum times and poled by two negroes that lazily furnish power to the dilapidated raft.

### Forsaken Field of Honor

This forsaken field of honor, which is within 5 minutes' drive of the center of Augusta, is a most scenic retreat, a restful, peaceful woodland on the grassy slopes of the river. The best time to visit it is in

the early morning, when the dew still is on the grass and the sun is just peeking through the foliage of the trees, for it is then that the proper atmosphere is present and it is easy to people the historic place with phantom duellists and their seconds while imagination points to a maiden hiding among the trees and waiting for a bullet to decide which of two rival suitors shall win her hand.

Fancy and Romance must be your guides to the lagoon. When you are there, you must recall that southern blood ran hot 50 or more years ago and that duelling was an honorable practice. You must forget about motor cars, movies, safety razors and all modern things. They are anachronisms there. The phantom characters that inhabit the place wear high beaver hats and ruffled shirts and tight trousers. They



6—Poets' monument to James Ryder Randall, Sidney Lanier, Paul H. Hayne and Father A. J. Ryan

ride to the scene of personal encounter on thoroughbreds and fight with big-mouthed, snub-nosed, peculiarly murderous-looking weapons that were rather fashionable before the Civil War.

According to the oldest inhabitant of Augusta, the most famous duel ever fought at the lagoon was the meeting of Tilly and Radcliffe in 1876, the result of a political dispute, but of the number of encounters that have been held there, there is no record. In Major Ben C. Truman's "The Field of Honor," I find several references to the lagoon, among them the following:

"Early in the nineteenth century, a meeting took place near Augusta (Ga.), between Captain Robert Flournoy, an ex-officer in the Revolutionary army, and Thaddeus Holt, a prominent Georgian. Both gentlemen were distinguished shots; so the news of the impending combat spread far and near, and the duel was fought in the presence of many spectators. The combatants met with holster-pistols, at ten paces, and at the first shot, both fell, Holt mortally and Flournoy seriously wounded. Holt's tongue was cut off by Flournoy's bullet, while the missile from Holt's weapon ploughed a furrow in Flournoy's forehead and took off part of his left ear."

#### Augusta's Charm

Augusta's charm, however, is not confined to its famous duelling ground and the romance of the wooded lanes of the lagoon. It has all the attractions for the tourist that come with age. The first sentence of the city's history was written 180 years ago, for it was in 1836 that the



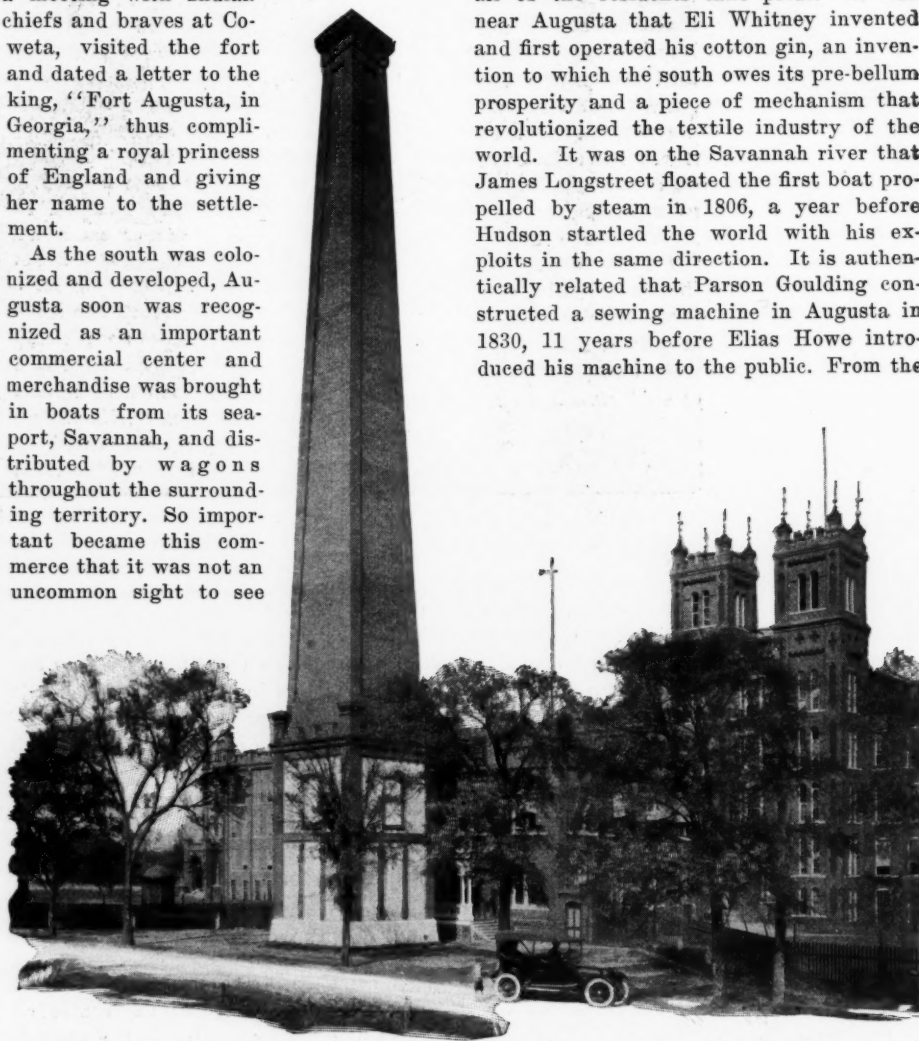
Road map of southeastern states showing touring connections to Augusta

town was laid out and a fort, commanding the Savannah river, built by order of General Oglethorpe and the trustees of the colony of Georgia. This was the foundation of the Augusta of today. Three years later, Oglethorpe, on his return from a meeting with Indian chiefs and braves at Co-weta, visited the fort and dated a letter to the king, "Fort Augusta, in Georgia," thus complimenting a royal princess of England and giving her name to the settlement.

As the south was colonized and developed, Augusta soon was recognized as an important commercial center and merchandise was brought in boats from its seaport, Savannah, and distributed by wagons throughout the surrounding territory. So important became this commerce that it was not an uncommon sight to see

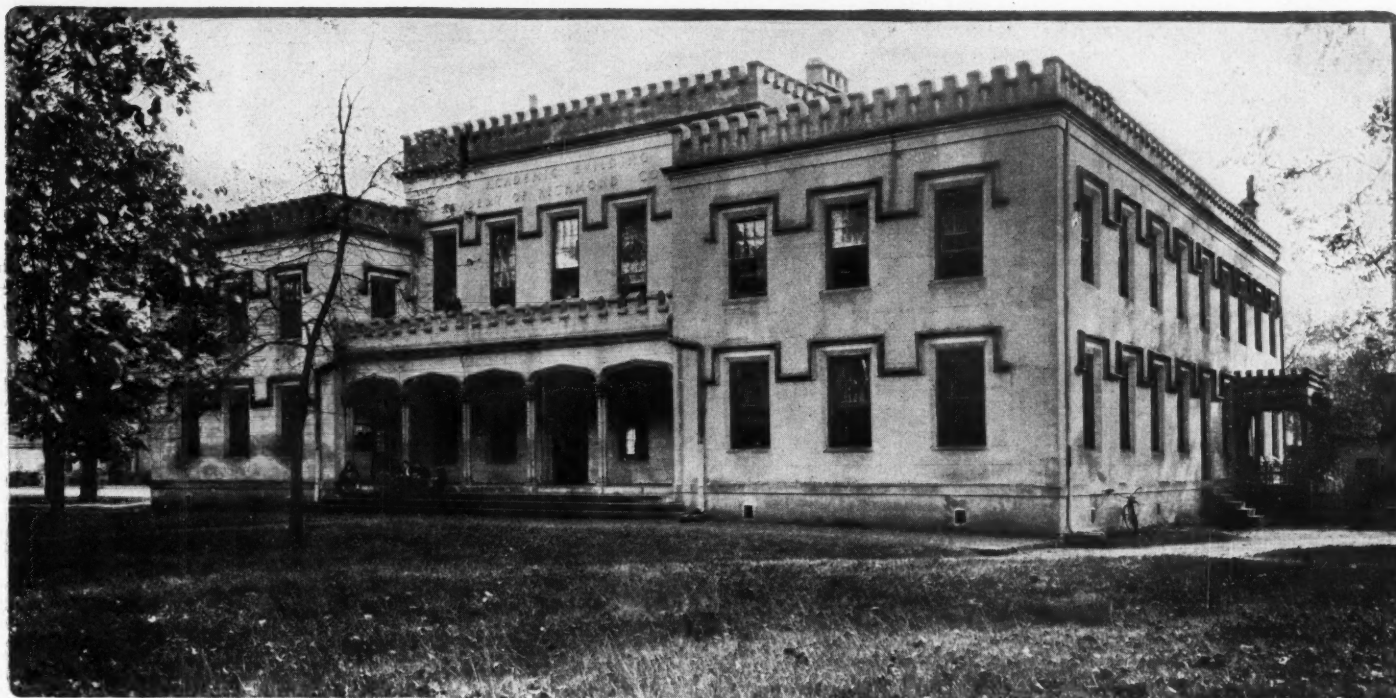
Broad street, the main thoroughfare, filled with wagons from bordering states, many of them coming hundreds of miles to trade with this prosperous city.

Augusta's part in the material advancement of the country is a thing in which all of the residents take pride. It was near Augusta that Eli Whitney invented and first operated his cotton gin, an invention to which the south owes its pre-bellum prosperity and a piece of mechanism that revolutionized the textile industry of the world. It was on the Savannah river that James Longstreet floated the first boat propelled by steam in 1806, a year before Hudson startled the world with his exploits in the same direction. It is authentically related that Parson Goulding constructed a sewing machine in Augusta in 1830, 11 years before Elias Howe introduced his machine to the public. From the



Powder mill chimney. At the time of the war between the North and South this powder mill was the largest in the world





*Academy of Richmond county, where President Wilson went to school. This is the oldest high school in the South*

famous Georgia State Medical College, the finest school and hospital in the south and a rival of Johns Hopkins, came Dr. Crawford W. Long, the discoverer of anaesthesia, the greatest boon ever given to suffering humanity.

There are several drives that the visiting motorists should take while in Augusta, the most popular being to Aiken, 18 miles north, the most fashionable winter resort in the south; to the green tea house at Bath, 16 miles south, made famous by John D. Rockefeller; to Pine Heights at Grovetown, 15 miles west, where ex-President Taft spends his winters; and to Harlem, 25 miles west, and the Knox House at Thomson, 37 miles west, noted for their ante-bellum cooking.

#### **Roadways Bear Popularity Testimony**

The famous roadways leading out of Augusta today, modernized in every respect, bear silent testimony to the wonderful popularity enjoyed by the city. The famous old Milledgeville road is still a much traveled highway, connecting Augusta with the old capitol of Georgia and in its early days the pilgrimage over the old road was almost equal to that enjoyed now by many railroads. Cities that have faded away and communities that have lost their individuality still have their names recorded on the roadguide posts leading out of Augusta. One of these famous roads is the old Petersburg road, stretching up the Savannah valley. In the olden, golden days, Petersburg was a big trading point, getting its supplies from Augusta. Now it is almost like a deserted village, for all the community round about is thickly settled and here and there and everywhere along the way are towns as big as ancient Petersburg.

The old Washington road, going over into Wilkes is another, while the old

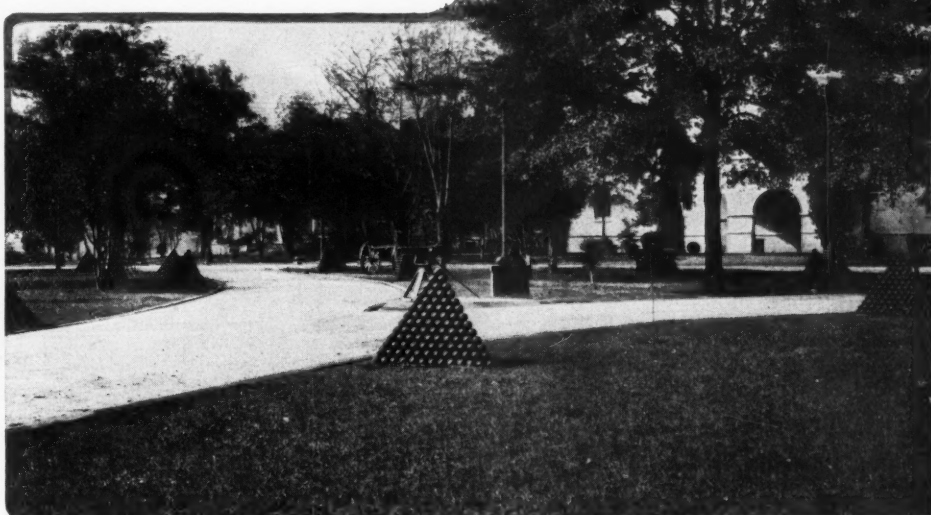
Wrightsboro road is still a popular highway. The Columbia road goes over to Appling, in Columbia county, at that time the seat of learning in Georgia. On the Carolina side roads were not so numerous, for the ferries caused them to converge with one road, but the Martintown road is probably one of the most famous of all in the Palmetto state, though, of course, the turnpike down to Beech Island and across the ever-famous Sand Bar ferry, will always be regarded as one of the greatest highways of the surrounding section, for it is one filled with history and for sentiment none excels Lover's Lane, which is a branch of the Sand Bar ferry road.

During the Revolutionary war, the state legislature held its sessions at irregular intervals in Augusta and in 1786, the city became the seat of the state government, continuing as the capitol until 1795. The old state house stood on the east side of

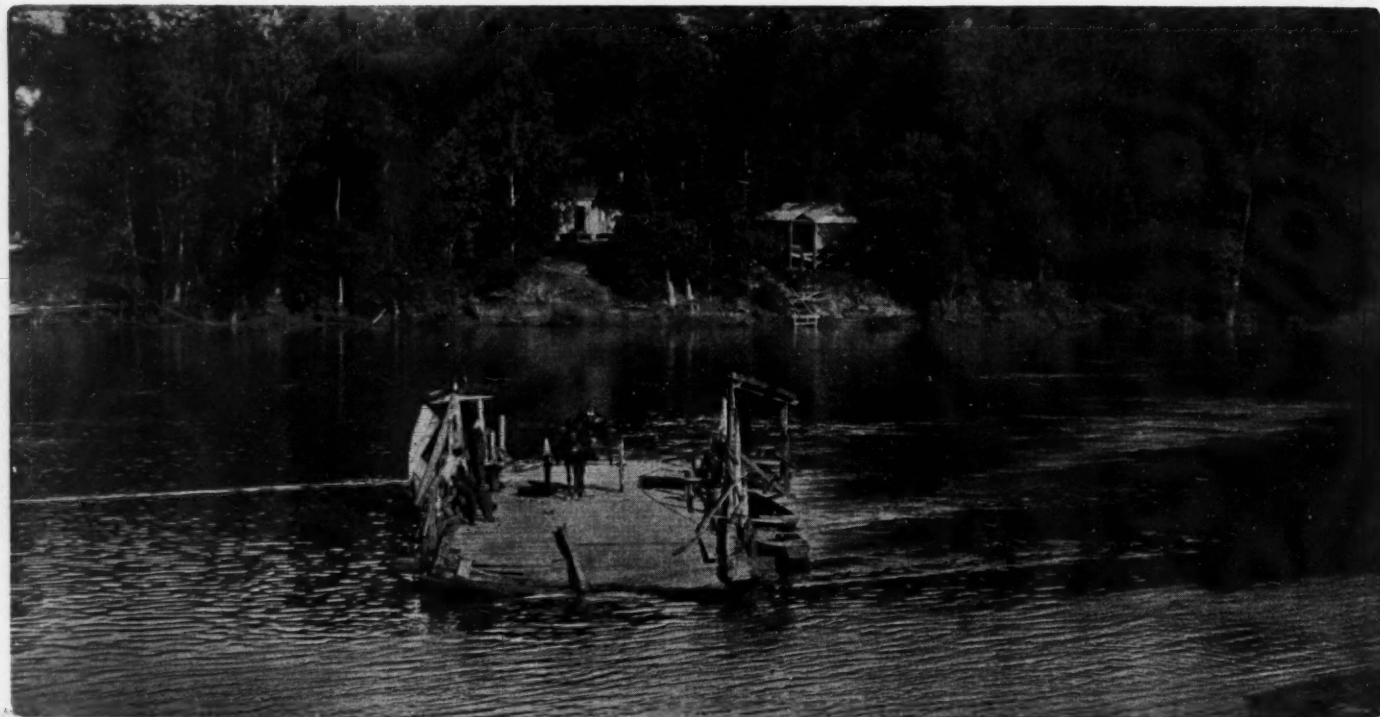
McIntosh street, between Broad and Ellis, where its site now is marked by a bronze tablet.

#### **An Illustrious Name**

Perhaps the most illustrious name in the annals of Augusta is that of George Walton, one of the signers of the Declaration of Independence. His biography is most interesting. Apprenticed to a carpenter, he studied law at night by the light of pine knots and in 1774 was admitted to the bar and began practice at Augusta. He was one of the leaders in the Revolu-



*The arsenal. Ordnance department of the U. S. government. This view shows only a small portion*



4—The ferry; site of old and famous dueling grounds. The Tilly-Radcliffe duel was fought here in 1876. This was the most famous duel in history

tionary movement, calling a meeting of the patriots in Savannah in 1774 to discuss measures of resistance against the arbitrary rulings of Great Britain. After serving as a delegate to the Continental Congress, he was appointed a colonel of militia and commended a battalion under Howe when Savannah was captured by the British in 1778. In this engagement, he was seriously wounded and taken prisoner. After peace was declared, he served two terms as governor of the state and 2 years as a United States senator.

#### Meadow Garden Home of Walton

The home of George Walton, Meadow Garden, is one of the cherished landmarks of Augusta, for it was here that George Washington was entertained in 1791 when the first president made a tour of the country. The old house, featured by a wide porch and gabled windows, belies its age. Partly concealed by dense shrubbery, from the road it looks like a cottage and the tourist would not be inclined to associate it with the distinguished persons that have found shelter under its roof. Famous hands—including the hand that drew the sword of the commander-in-chief of the Revolutionary army and the hand that signed the Declaration of Inde-

pendence—have shook the brass knocker on the door, however, and the old house once was the scene of revelry.

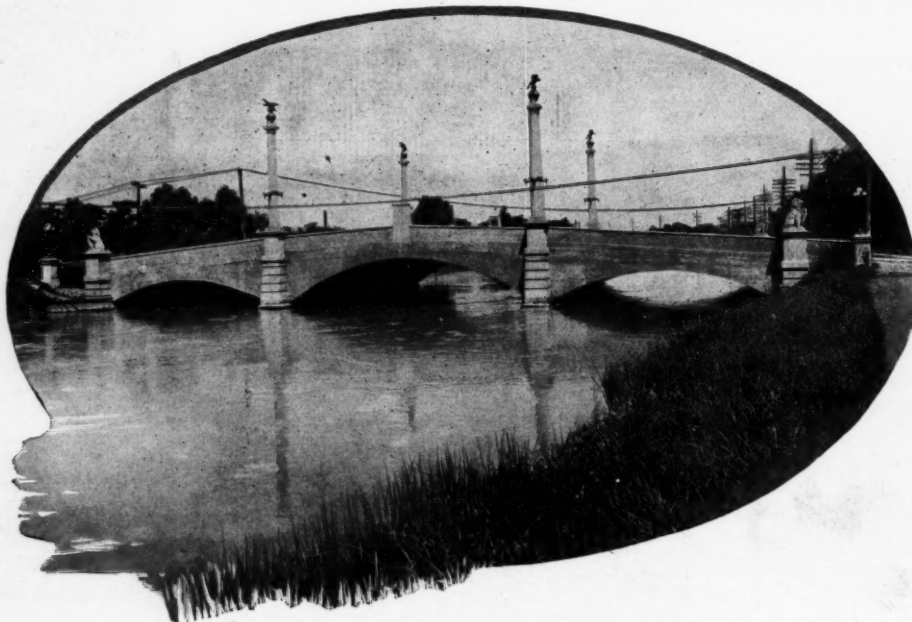
Like its seaport, Savannah, Augusta was held by the British during the war for American independence and during these dramatic years, was the scene of several notable battles. There were two forts located in the city during the revolution—Fort Cornwallis at the rear. St. Paul's church and Fort Grierson, situated about ½ mile west. General Harry Lee, father of Robert E. Lee and known in history as "Light Horse Harry," was one of the leaders in the attack on Augusta, which resulted in the capture of the two strongholds and the evacuation of the city by the troops of the English King George.

Thus, St. Paul's church of the present day once was veiled in the smoke of cannon. According to the archives of the city, "the gentlemen of Augusta in 1750 built a handsome and convenient church" opposite the curtains of the fort and near enough to be protected by its guns. The church stood on the frontier line of civilization in Georgia and was appropriately named for the great pioneer among the twelve disciples, St. Paul. It not only was the first church in the settlement but for more than 50 years the only house of worship of any kind in Augusta.

#### St. Paul's Cemetery

In the burial ground of St. Paul's church lie the remains of several of Augusta's most distinguished residents, but the dust of the city's greatest patriot rests beneath a shaft of granite, erected to the memory of the three signers of the Declaration of Independence from Georgia—George Walton, Lyman Hall and Button Gwinnett, the first two being buried under the monument that stands in front of the court house on Greene street. Gwinnett's ashes lie in the old colonial cemetery at Savannah. He was killed in a duel with General Lachlan McIntosh.

The powder mill monument, a chimney of bricks preserved



The Archibald Butt memorial bridge



for this purpose when the Confederate powder mill was torn down, is Augusta's most striking memorial of the Civil War. The powder mill, located on the banks of the Augusta canal, was the largest in the world, and furnished all the powder used by the south in the struggle against the north. Incidentally, Augusta contributed thirteen generals to the lost cause: Joseph Wheeler, LaFayette McLaws, Ambrose Ransom Wright, Alfred Cumming, Montgomery Gardner, M. A. Stovall, John K. Jackson, Goode Bryan, William E. Boggs, William D. Smith, Victor J. B. Girardey and David E. Twiggs.

On Board street, in the very center of the business district, stands one of the handsomest monuments in the south, erected to the memory of the Confederate dead. The shaft is 85 feet in height and is surmounted by a heroic statue of a private soldier. At each corner of the base is a statue of a southern leader: Robert E. Lee, "Stonewall" Jackson, Thomas R. K. Cobb and W. H. T. Walker.

Another monument of interest is that on Greene street, erected to the memory of four southern poets: James R. Randall, author of "Maryland, My Maryland" and a native of Augusta; Sydney Lanier, most fa-

mous of all Dixie's bards; Paul H. Hayne, the soldier-poet of South Carolina; and Father Ryan, who wrote the "Sword of Lee" and "The Conquered Banner" and at one time made Augusta his home.

#### Archibald Butt Memorial

Another memorial, erected in honor of a present-day hero, is the Archibald Butt bridge which spans the Savannah river and was built with money raised by popular subscription. Butt, who was internationally famous as the military attache on several presidential staffs, died that the women and children might be saved when

the Titanic struck an iceberg and went down. Augusta was his birthplace.

At one end of the bridge is a memorial to perpetuate the name of a local hero, Dennis Cobie, a humble workman, who lost his life in an attempt to save two children from drowning. It is but a pile of boulders on which has been riveted a bronze plate, inscribed with the name of Cobie, and a short description of his heroic deed. The proximity of the two memorials and the difference in station of the two men that they honor are most interesting; newspaper writers would call it "sob stuff."

Richmond Academy, the oldest preparatory school for boys in the United

States and the first educational institution to receive a charter from the state of Georgia, is another place of interest. It was established in 1783 and many of its students have become prominent in national life. On the campus of the academy President Woodrow Wilson and George Stallings, manager of the Boston Braves, learned to play baseball.

Augusta, by the way, is of especial interest to the baseball fan because of the fact that Tyrus Raymond Cobb, the greatest outfielder of all time, makes his home in the city when he is not bursting fences.



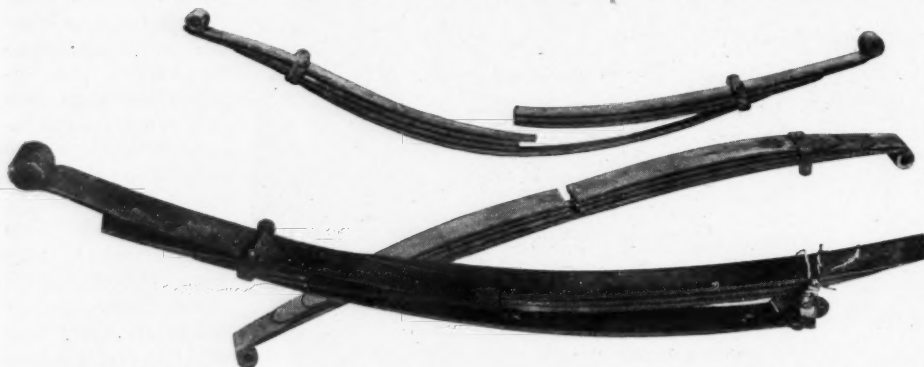
*Meadow garden, home of George Walton, one of the signers of the declaration of independence, where George Washington was a guest*



*The Hampton terrace, one of Augusta's three winter hotels*

# Re-Tempering Springs to Renew Resilience Prevents Breaking

Most Breakages Would Be Avoided by Giving Same Care to Springs That Is Given to Some Other Parts of Car by the Owner



**EXAMPLES OF COMMON BREAKS IN SPRINGS**—Broken clips frequently cause the spring to snap under the strain of a sudden shock. Accidents are oftentimes the cause of the clip being broken, the spring itself breaking last as a result of the rebound, or sudden increase of tension due to the snapping of the clip. Such a breakage is illustrated in the spring mended with wire. The inner leaf was snapped off by the strain resulting from the breaking of the clip in a collision. Loosening of a clip is almost equally bad. Breakage occurs frequently where the bolt passes through the spring, as in the upper spring in the photograph. Too hot a temperature in the tempering oven produced a brittle spring. This spring was new when broken. The spring in the middle snapped after one of its leaves, the one remaining intact, had been welded by a country blacksmith. The inner leaves broke over the point where the weld was made.

If your car does not run as smoothly as it did last season, perhaps it is because the springs need attention. A bad pair of springs will cause unnecessary wear and tear in all parts of the machine, especially in the working parts. The car owner who would spend an hour in a repair shop where springs are rebuilt, repaired and re-tempered would pick up several valuable pointers on how to care for the springs of his own car.

The gradual loss of resilience in these parts may easily pass unnoticed until the life of the spring is practically gone. On the other hand, a due regard for keeping the springs in good condition would probably have prolonged their life considerably, even doubling it sometimes. Most of springs break because they are worn out from much use. When the resilience is lost, a spring will snap when a hard bump jolts the car. The same spring might have served 2 or 3 years longer if it had been re-tempered when its resilience had not been too far exhausted, or before settling had been too long neglected.

## For Worn Springs

Worn springs should either be replaced with new ones, or re-arched and re-tempered. Such precaution works to diminish the strain on the engine, the transmission and the bearings. It is important to observe the condition of both the front and rear springs from time to time if the easy riding quality of a car is to be preserved. A small defect may be discovered in time to prevent the spring being ruined. A check may have appeared in the metal which will some day break. A single leaf may break, but frequently several leaves snap in two at the same point. If the defect is discovered soon enough, a new leaf

can be substituted at small expense and the spring will be stronger than it was before. Breakages which start from a

**AN UNUSUAL MISHAP**—A double break, like that shown here, is of rare occurrence. This break resulted from the steel being tempered so hard that it was brittle.

small defect in this manner are usually due to faulty tempering.

Another common mishap which results in breakage is the loosening or breaking of clips. Accidents occur in which the clip fails to withstand a sudden strain. It breaks and, many times, one or two leaves of the spring break from the rebound caused by the snapping off of the clip.

The car should be taken into a service station periodically and the springs examined. In all the larger cities there are special spring service stations whose men are experts in spring repair. The Triple Action Spring Co., for instance, has service stations in 120 cities of the country.

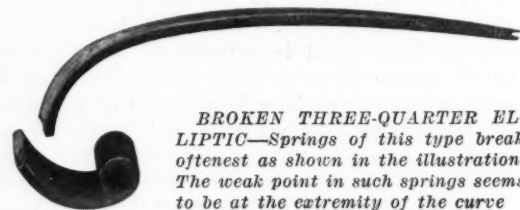
In the service department of the company's Chicago headquarters they replace a broken spring almost as quickly as replacing a tire when occasion demands. The record is 9 minutes. Broken leaves are repaired, the springs re-arched and re-tempered, and replaced in the car in from 30 to 50 minutes. A new spring has been installed in a 3-ton truck in the record time of 15½ minutes. Nearly 1,300 standard sizes and types of springs, for all makes of passenger cars and trucks, are kept in

stock. Seldom is there a call for repairing or replacing a spring which requires that a complete new one be built to order, so that every job is handled in the minimum time.

During the busy season, the number of machines which are driven into the shop with springs broken or in need of attention range from 100 to 125. The record last summer was 135. Practically all cars repaired in the Chicago service station are from that city and its suburbs. A business almost equally large is carried on at each of several stations in other large cities. Shipments of springs to fill miscellaneous orders from outside points amount to many tons per week.

## Rapid Service

"Service built my business," declares Oliver G. Temme, president of the company, who started the business seven years ago when he was wearing overalls and had only \$15 capital. "It isn't because we sell springs but because we sell service that we have the biggest business of its kind in the world."



**BROKEN THREE-QUARTER ELIPTIC**—Springs of this type break oftentimes as shown in the illustration. The weak point in such springs seems to be at the extremity of the curve.

Service, according to Mr. Temme, consists in keeping a truck or passenger car in the repair shop only 30 minutes when a spring breaks rather than 4 hours or 4 days. The owner of a delivery truck



**SPRINGS FOR EVERY CAR**—A few of the 1,200 kinds of springs built and kept in stock by the Triple Action Spring Co. From top to bottom the springs are: Scrolls, or upper quarters, of standard design, known as "jacks"; Briscoe, front; Ford, rear; Buick, rear; Ford, rear, cantilever type.



usually considers it worth from \$12 to \$14 per day. Without it the business would lose that amount or more through inability to make deliveries promptly. Therefore, if the owner is enabled to save 4 or 5 hours of the time, his mechanics or his garage would require to replace a spring, he will find it desirable to invest in the kind of service which makes possible the saving.

As many as twenty-five cars may be seen on the floor in the busy season. Thirty-five men were employed last summer by the company, enough to handle jobs as fast as they came in. During the winter twenty-two men are at work. If work is slack at any time, owing to bad weather, the stocks of springs in the stock room are replenished.

Two men with kits of tools go to work detaching a spring as soon as a machine is driven onto the floor. A requisition for new stock is put in the hands of the stock man even before the spring has been taken from the car. The blacksmith has the raw stock and is ready to proceed with the work as quickly as the spring is laid on the floor. The forge work includes sizing, arching, beading, and putting the material in shape for the fitters, who see that the proper spring suspension has been allowed.

#### Grade Up Springs

Defects in design are corrected and weak points strengthened. The breaks in not a few springs occur toward the end of the longest, or inner, leaf, at the point where the leaf above it ends. This would indicate that the broken leaf was not strongly enough reinforced and that the adjacent leaf should have been longer. A difference of  $\frac{1}{2}$  inch in the second leaf is enough to overcome a defect in design of this kind.

It is the practice of the Triple Action Spring Co. to "grade up" the springs, not precisely as the design calls for, but according to the general rules which are found to give the best all-round results.

By "grading up" a spring is meant the distance which each succeeding leaf shall overlap. The contour of the finished spring is full or tapering, according to the "grading up" of the several leaves.

The fitters complete the work and deliver it to the men at the tempering furnace. One illustration shows the method of fitting the upper leaves after the first one has been properly arched. Two fitters will handle several hundred springs per day. The plates are heated in the same furnace used for tempering. This is a gas furnace of special design. Instead of heating from below the gas flames are placed above the steel. It heats the metal to a temperature of 2200° F., which is the tem-



*BUILT ON THE SAME ANVIL—A diminutive Scripps-Booth front spring and two giant truck springs. The weight of the small spring is 17 pounds. The spring in the middle is a Mogul rear, weighing 220 pounds. The third spring, a Reliance rear, for 3½-ton truck, weighs 225 pounds*

pering heat used uniformly by the company. The furnace was designed to give a steady and uniform heat especially to overcome the variability of heat which occurs in tempering with oil, even under the most favorable conditions. A high grade of oil is used for immersing the steel. It costs four times the amount of the oils which are sometimes used for tempering, but the superiority of the oil is said to result in giving a greater uniformity of hardness. One tempering furnace will take care of from 650 to 700 plates per day and two new furnaces are to be installed this summer.

The company has 16,000 springs in stock.

These include springs for any size and type of car built since 1902, whether the car is still manufactured today or not. The company buys steel in train-load lots.

#### PITTSBURGH WANTS LICENSE REVENUE

Pittsburgh, Pa., March 11.—Mayor Joseph G. Armstrong threw a bomb into the comparatively placid ranks of motorists at the first annual banquet of the Automobile Club of Pittsburgh in the Hotel Schenley this week, when he said that the city must have another source of revenue and that taxing motorists offered the most feasible way of raising the money.

"There has been a great change from horse-drawn vehicles, the licenses for which netted the city \$15 each, to motor-driven vehicles, which do not pay the city anything, but pay all of their license fee to the state. And yet there has been a radical change in the construction of street paving, the new paving costing much more than the former to conform to the wishes of automobile owners. Last year the city paid to the state \$600 in license fees to operate its own cars on its own streets. There is something wrong there. I do not say there is no other way than an additional tax on motor car owners, but the city is entitled to a division of the spoils."

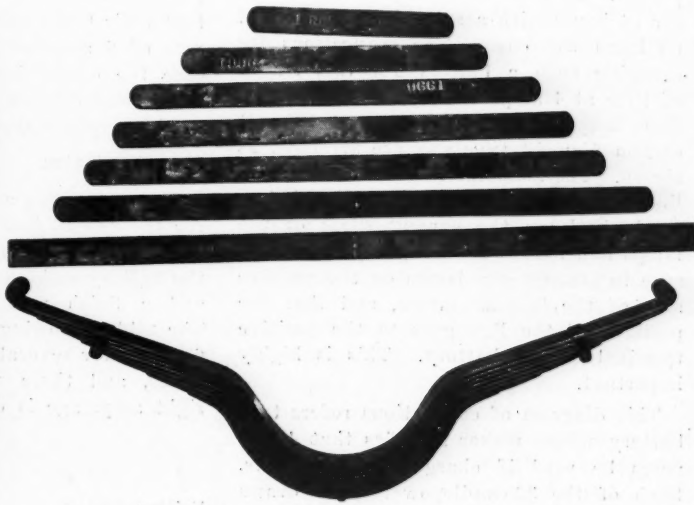
#### NATIONAL GAS ENGINE MEETING

Chicago, March 13.—Plans are rapidly nearing completion for the next annual convention of the National Gas Engine Association, which will be held at the Sherman Hotel, Chicago, June 27, 28 and 29, 1916. The matter of scientific cost accounting is of more than ordinary importance, and one session of the convention will be devoted to this subject. Some of the problems of the sales managers will be discussed in a similar meeting with O. C. Parker, chairman.

"Tractor and Tractor Engines," will be the general subject for a third session, at which several papers will be read.



*THE FITTERS' TASK—Spring steel has one concave face and a convex face. The inner, or concave, face must make contact at all points with the convex surface of the next leaf. This is only one of the fine points of workmanship which enters into the manufacture of springs. The life of the spring depends much on the fitters' skill*



*THE RAW STOCK AND FINISHED SPRING—This is a view of a Ford rear spring, before and after. The accompanying illustration shows the same spring in the making. A single leaf of the spring, or all seven leaves, can be taken from the bins of raw stock and in from 10 to 20 minutes be on the street doing service*



# The Motor Car Repair Shop



## Caring for the Battery—Part IV

**M**OTOR AGE frequently gets requests from readers asking for the simplest methods of charging various types of storage batteries from a variety of current sources, and in order to make clear the principles underlying such charging, we will go into the matter at some length.

First and foremost, let it be understood that a battery cannot be charged from an alternating current line, as the action of the battery either when charging or discharging depends upon the direct flow of current. This should be clear from the remarks made on the theory of storage battery operation in Part II of this series. If the supply source is alternating, then a rectifier of some kind must be used to transform the alternating current to direct before it can be utilized for battery charging.

The simplest method of charging small batteries, such as used in the lighting and starting system of the average car, is to make use of the ordinary direct current electric lighting circuit, employing carbon filament lamps in parallel, the current being given the required value by varying the number of lamps. The necessary apparatus for such charging does not cost very much, and the connections are so simple that no trouble should be had on that score.

### Charging From 110 Volts

In order to have some basis to work on, let us assume that we desire to charge a 6-volt, 80-ampere-hour battery that is very nearly empty. The best way is to charge it for a long period at a low amperage. In most cases it can be left on for 24 hours with a suitably low rate and no harm will come. The connections for charging such a battery for this length of time at 4 amperes are shown in Fig. 1. The lamps are 32-candlepower, 110-volt carbon filament type and are arranged as shown. The ammeter indicated across the line is not absolutely necessary, but it is a good check on the current draw of the lamps and should be used, if possible. Be sure to connect the lamps on the positive side of the line as shown, and that the positive of the line goes to the positive terminal of the battery. This is highly important.

This diagram of connections refers to a battery whose maker specifies that 4 amperes be used if charged for 24 hours. Each of the 32-candlepower bulbs draws approximately 1 ampere, and they are connected so that this current adds up. If five of them were used then the charging current would be 5 amperes. The following table gives approximately the current

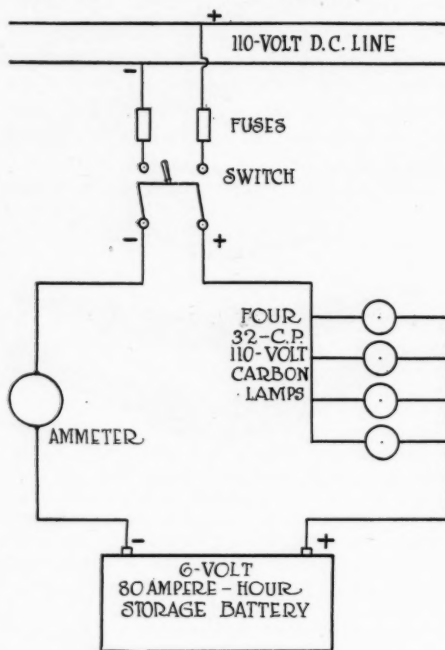


Fig. 1—Connections for charging battery from 110-volt D. C. circuit

drawn and the watts for several types and sizes of carbon filament lamps.

TABLE GIVING THE APPROXIMATE AMPERES DRAW OF DIFFERENT SIZES OF CARBON FILAMENT LAMPS

Candlepower	Voltage	Amperes	Watts
32	110	1.08	120
16	110	0.54	60
8	110	0.27	30
32	220	0.54	120
16	220	0.27	60

Obviously the charging rate determines the number of lamps used. For instance, the Willard storage battery people specify that their 6-120 battery be charged at the rate of 6 amperes for 24 hours. In this case the connections would be the same as shown, but six 32-candlepower lamps would be used instead of four.

### Charging Rates

But more often a battery is not charged for the full 24 hours, because it generally does not get so fully run down, and hence the battery makers specify a starting rate and a finish rate for normal charging. The table following gives Willard's specifications for several standard sizes of batteries, and these will indicate how the right amperage is determined.

TABLE OF CHARGING RATES

Voltage	Ampere-hour capacity	Amperes required for normal charging		24-hour charging rate
		Start	Finish	
6	60	10	3 1/4	3 1/4
6	80	12	4	4
6	100	14	4 3/4	4 3/4
6	120	18	6	6
6	160	22	7 1/4	7 1/4
12	60	10	3 1/4	3 1/4
18	60	10	3 1/4	3 1/4

Now suppose it were desired to charge a 6-100 battery which was partially run down. Referring to the table we notice that the starting rate is 14 amperes and that the finish rate is 4 3/4 amperes. So with fourteen 32-candlepower bulbs in the circuit as in Fig. 1, we would start the charge and continue it until all of the cells gas freely. You can tell this by the bubbling. Then when this uniformity of action is observed, the charging rate would be cut down to 4 3/4 amperes by connecting in four 32-candlepower lamps and either three 8-candlepower or one 16 and one 8. Any combination could be used, in fact, that would add up to approximately 4 3/4 amperes. But where the voltage is very low, it is not desirable to hurry the charging and the overnight rate is best.

### From 220-Volt Leads

The above has all dealt with the charging of batteries from 110-volt circuits, but sometimes this very common electric light voltage is not available. Perhaps a voltage of 220 is used in the mains, or even 500. So long as they are direct current they may be utilized for small battery charging by cutting down the voltage, but it is, of course, more wasteful, to say nothing of the added amount of equipment you have to have. If you desire to use a 220-volt circuit, you can either use 110-volt lamps connected in pairs in series or better still use 220-volt lamps singly. The connections where the 220-volt lamps are used are the same as in Fig. 1, but you would have to use twice as many of them to get the same amperage to the battery. This will be evident from inspection of the amperage table. That is, if you wish to charge at 4 amperes from a 220-volt line, you must use eight 32-candlepower 220-volt lamps, connected as in Fig. 1. If you want to use 110-volt lamps with this 220-volt supply, the connections would have to be made as shown in Fig. 2, if you desire to get 4 amperes. Should five be required, another set of two lamps connected in series with each other and in parallel with the line would have to be used. To get 4 amperes from a 500-volt supply, you would have to connect the 110-volt lamps in rows of five and then have four rows. In this way each lamp gets one-fifth of the voltage and 1 ampere passes through each row.



The ammeter will tell you whether you have the right number of lamps in the circuit, and its value should be evident from the foregoing explanations.

It should be borne in mind that different battery makers recommend somewhat different charging rates for batteries of their make, and the right amount for any size and name of battery can easily be learned. The Willard rates are given here to serve as an example and indicate how the right lamp combinations are determined. The best way to do is to set up a series of lamps bases on a board or wall, and connect the wires to them, so that any number of lamps may be screwed in as needed. If 6-80 batteries are to be charged, the lamp bank should have a capacity of at least twelve bulbs, for you need that many to give you the 12-ampere starting rate.

Before beginning the charge, the vent plugs should be unscrewed and the level of the electrolyte in each cell examined. Pure water should be added if needed, and the vent plugs should be left off during the charging so that the gassing can be observed and not be restricted. During the charging the temperature should be watched, and should not be allowed to get higher than 100 degrees, unless it is unavoidable due to high temperature of the air. In case it does get above this amount, the best thing is to cut down the charging rate somewhat until it acts properly, or stop the charging long enough for the solution to get cooler.

#### VALUE OF UPHOLSTERY COVERS

Refinement has followed so close on the heels of refinement in the manufacture of motor cars that what was regarded as a luxury but yesterday is accepted as a necessity today.

Few designers are so confident of the demand for their product that they can afford, for example, to omit a self starting device from standard equipment of their product, and, with possibly not more than one conspicuous exception, the used car that has no self starting device is mighty hard to sell at anything like a satisfactory resale price.

But with cars that have all the prevailing equipment of present demands the resale price is determined largely by the general condition of chassis, body and finish when the car is turned in.

Investigation has shown that the condition of the upholstery is one of the most decisive considerations in the mind of the purchaser of a used car, regardless of whether such purchaser is a dealer expecting to sell again or a consumer selecting a bargain for his own use.

Further investigation shows that the used car that has been protected by means of good, well made upholstery covers of strong materials and tailored shape, will command an average of 10 per cent higher price than the car of similar grade and general conditions that has not been thus protected.

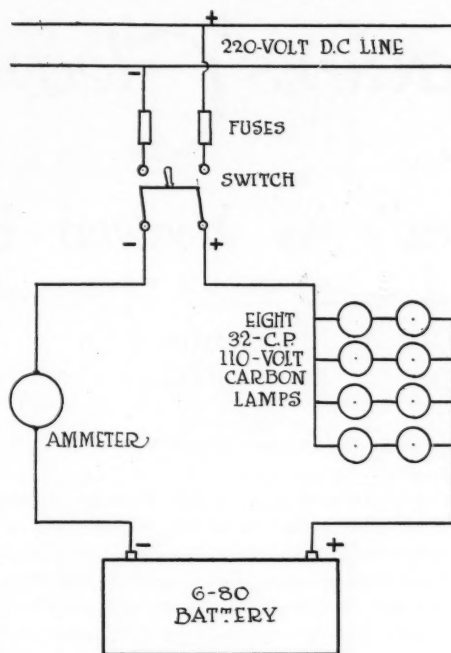


Fig. 2—Connections for charging a battery from 220-volt D. C. circuit

This explains why it is that the dealer has such a vital interest in selling seat covers. It is not only for the profit he makes on each sale but for the purpose of safeguarding himself against having unpleasantness with his customer when asked to make an allowance on the car at the time of its return and also to insure him against being placed in a position of being obliged to make an unreasonable allowance on a car that he will not be able to sell again at a profit.

From the customer's point of view the upholstery cover is both a necessity and a luxury. Any car owner who realizes that the upholstery covers will add 10 per cent to the resale value of his car will quickly figure that this means that the covers actually cost him less than nothing. If the resale of the car were only \$500 without this protection, the covers would make a value of \$550. This would be much more than the cost of the covers for the average car.

#### TO PICK GEORGIA-DIXIE ROUTE

Atlanta, Ga., March 13—The commissioners of the Dixie highway will leave Macon, Ga., Monday morning, March 20, for an inspection tour of the two proposed eastern branches of the Dixie highway south of that point, with the view of selecting one of these routes as the official route.

Under the rules of the Dixie Highway Association, two commissioners are named for each state through which the Dixie highway passes, whose duty it shall be to select the route of the highway through their respective states. Failing to agree upon a route, the question is referred to the entire board of commissioners.

For the eastern route there are two proposals. One leads from Macon, via Fitzgerald and Waycross, Ga., to Jacksonville.

This route is as the crow flies and is known as the short route.

The other proposed eastern route is from Macon, via Milledgeville, the ante-bellum capital of the state, Savannah and Brunswick, to Jacksonville. This is a much longer but by far the more attractive and interesting for strictly touring purposes. This has become known as "the Old Capital Route."

#### TRI-CITY ASSOCIATION ACTIVE

Rock Island, Ill., March 11—Organized a few years ago by a handful of dealers, the Tri-City Automobile Trade Association, has now increased to thirty-five members, all of whom are co-operating to improve the conditions of the trade.

Recently, a committee of the association arranged a conference with the mayors and chiefs of police of the three cities in relation to a uniform system of dimming the lights of cars, thus enabling the owner to go from city to city, knowing that the laws and regulations are the same in each. The association is now discussing a suggestion to secure a salaried secretary who will devote his entire time to the problems of the dealer and owner and work for the interest of both at the expense of the former.

#### MUST MAKERS SOLVE GLARE?

Boston, Mass., March 11—Laws enacted by many of the state legislatures and city councils seek to remedy the dazzling headlight. In Massachusetts, for instance, this popular sentiment has crystallized into a regulation by the state highway commission prohibiting the use of headlights which throw out dazzling rays more than 3½ feet above the ground on a level road 50 feet or more ahead of the car.

This regulation is causing no little confusion, discomfort and irritation among drivers of motor cars in the Bay state, especially among those who paid more than \$3,000 and \$4,000 for their cars, for, as they contend, the manufacturers of a motor car should have foresight enough to anticipate what even a Massachusetts highway commission may choose to foist upon the patient, long-suffering and withal law-abiding motoring fraternity.

#### IOWA WANTS NATIONAL PARK

McGregor, Ia., March 11—The desire of Senator Kenyon to have a national park created to embrace the district near McGregor, adjacent to the Mississippi river, is gaining such united support locally and throughout the state that now it seems probable that the movement to establish the park will succeed. Active work is being done in this direction by civic and commercial bodies in the various counties and towns of the vicinity, the leadership being taken by the Mississippi Valley Park Association. A campaign is being carried on by the organization. The proposed park would cover a territory which is noteworthy for the scenic features of its hills, canyons and woods.

# The Readers' Clearing House

## "Unconsidered Trifles" As Viewed by Another Reader

ORLANDO, Fla.—Editor Motor Age—At last I see that some one has the same thoughts about certain things that I have, meaning "Unconsidered Trifles," by C. D. Enfield, in Motor Age, February 24 issue. Mr. Enfield has started the ball rolling and I shall give it another onward boost. The only fault I find with the said article is that Mr. Enfield did not go far enough. Of course, I realize that the space was limited, and that is probably his reason, but while I am in favor of the different points being improved, I am not willing to stop there. If manufacturers would only drop motor and body improvements for one year and devote a little attention to the Unconsidered Trifles, I, for one, am sure that car sales would increase and the buyers would be satisfied.

Among other things let us mention the speedometer arrangement. On nine out of ten cars it takes a contortionist to read the speedometer, while drive and dash lamp usually illuminates everything except the oil gauge and speedometer, for which I suppose they are intended. The oil gauge is seldom anything except a piece of glass and we have to imagine that we have enough oil to get home on. On the gasoline tank, we do not even have a piece of glass, but in most cases it is necessary to get out, remove cushions and hunt for a stick, then measure how deep the fuel is in the tank, and then suppose that you can make another 25 miles before it becomes dry. One adventure I have quite frequently is the adventure of the transmission. Of course, it sometimes needs oil or gauge, and I go on a voyage of discovery. First, I have quite a lively time getting the floor boards out, but after some very narrow escapes and several barked knuckles, I succeed in getting them out. Next, it is necessary to remove about a dozen bolts, screws and cotter pins, take off the hand brake lever, control lever and top of transmission case. Then, if I am lucky, I can see how much oil is needed. When, instead of all the above trouble, one plug in the side of the

### Supports Stand Taken by C. D. Enfield in Recent Issue

case at the proper height would be sufficient.

I cannot enumerate all the small points that should be improved. I find lots of room for improvement in arrangement of speedometer and the odometer resetting device, design of accelerator, which is nearly always placed in an accessible place as if it should be regarded as a relic and not touched. The control lever is nearly always too long or too short and too far away; floor boards too hard to remove, grease cups too hard to get at, oil gauge never works, absence of gasoline gauge, accelerator and cut-out pedal fastened to floor boards when they should not be. Last, but by no means least, a few tools in the kit that would fit some of the bolts and nuts on the car and a jack of a height that will go under the axle and at the same time be strong enough to lift a 3,000-pound car. There are lots of other points that deserve attention, but I hope some one else will continue our discussion, because a lot of good can be derived from same.—A. J. Routhier.

### THE BAUME-GRAVITY EQUIVALENTS Confused as to Difference Between Specific Gravity Readings and Arbitrary Scale

Massbach, Ill.—Editor Motor Age—Kindly explain by diagram how to install and connect an ammeter in the North East electric system used on a 1913 Michigan 40.

2—I am considering installing Gray & Davis ammeter. Would this ammeter prove satisfactory in this system?

3—What is the actual horsepower of the motor of the Dodge car?

4—Kindly give the address of H. P. Manley, the author of The Modern Motor Car, and what is his present occupation?

5—Kindly give some plan, or help in judging the value and condition of used cars.

6—There seems to be some confusion on the term "test of gasoline," as I have read in some books that gasoline is always tested by a system called Baume gravity. This system being just opposite specific gravity, which is sometimes used, that is, the higher the specific gravity, the lower the Baume gravity, and the

lower the specific gravity the higher the Baume gravity. Thus a good grade of gasoline should have a high Baume gravity and a low specific gravity test. On the other hand, I have seen in Motor Age and other publications prices of gasoline given according to the specific gravity test. The higher the specific gravity, the higher the price, thus it must be a better grade of gasoline. This is just the opposite of that published in some books.

Gasoline sometimes also is listed according to gravity test, without mentioning whether it be specific or Baume gravity. In such cases, which is meant?

Kindly explain in full how gasoline is tested; what is meant by good or high test gasoline; what is meant by specific gravity and Baume gravity?—A. D. Haas.

1—Referring to Fig. 1, the necessary connections for installing an ammeter into this system are brought out clearly. It should be put into the circuit between the starter and the storage battery so that the full current passes through it.

2—Yes.

3—This motor is conservatively advertised as having from 30 to 35 horsepower. The formula rating is 24.22.

4—Write Laird & Lee, Inc., 1742 Michigan avenue, Chicago.

5—This so largely is a matter of judgment, common sense and experience that Motor Age begs to be excused from going into the matter at any great length. To judge the condition of a used car, it should be gone over part by part and by someone who is reasonably well informed on cars. Even then you cannot arrive at the exact condition of the car because there may be defects that do not come to light even on the closest inspection. The safest way in buying a used car is to take the word of a reliable dealer that it is in the condition he claims for it. It would not be a good policy to depend too strongly on the word of one you knew to be unreliable. Sometimes a bright exterior hides a multitude of faults.

6—The Baume method of determining specific gravity is simply by the use of a hydrometer having an arbitrary scale, each degree on which represents a certain specific gravity. The readings on the Baume scale correspond to two different kinds of liquids—those heavier than water and those lighter than water, which is considered as having a gravity of 1. The tables of Baume reading and equivalent specific gravities for liquids lighter than water and also for those heavier than water are given herewith so that you may see clearly just how they run. You will notice that when referring to a liquid heavier than water, the higher the Baume reading, the heavier the liquid. With liquids lighter than water the opposite is true. That is, the higher the Baume reading the lighter the liquid is.

Usually when a gravity of a fuel is given it refers to the Baume scale, and if it

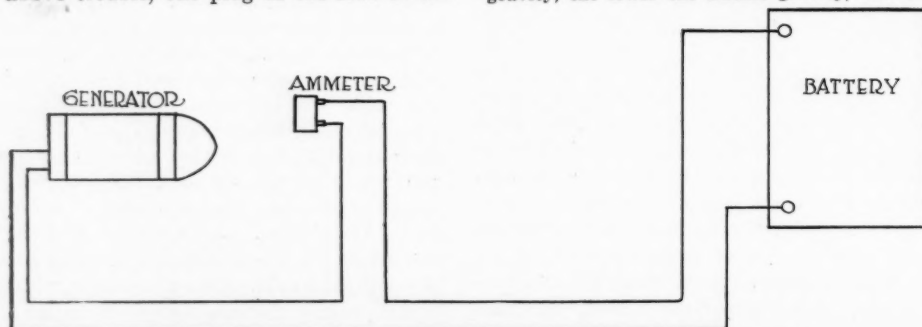


Fig. 1—Installing an ammeter in northeast system on 1913 Michigan 40



does not, mention should be made of the fact that it does not. The Baume hydrometer is the standard used by the oil companies, and whenever they tell you that their gasoline tests 62 degrees, for instance, that means 62 Baume. That means that its specific gravity is 0.7290, as you will notice by referring to the table of liquids lighter than water, gasoline being in that class. At the present time the oil companies are supplying gasoline that ranges from 60 to 62 degrees. This means that it has an actual specific gravity of from 0.7368 and 0.7290. Gasoline is tested in the same way that you would test any other liquid. A hydrometer is floated in it and the reading on the scale indicates the gravity. Attention should be called to the fact, however, that the specific gravity is not a very accurate indication of just what the value of the gasoline is as a motor fuel. For instance, two gasolines with practically the same gravity test will have widely different combustible and heat properties. High test gasoline usually means a fuel with a gravity around 72 degrees, Baume.

Probably, in reading the books and periodicals you mention, and in which a high gravity was spoken of as better, they failed to state that they meant Baume scale, thus confusing you. Of course, the higher the Baume reading the better the gasoline, although the actual gravity grows less due to the fact that it gets lighter. Naturally the lighter the fuel the more readily it vaporizes.

#### Meaning of Double Pedal Action

Grand Forks, B. C.—Editor Motor Age—In Motor Age, issue February 17, Taylor Smith asks what is meant by double pedal action in speaking of the clutch in gear shifting. The answer was "You did not know, not having encountered the expression, but that it might mean a pedal that

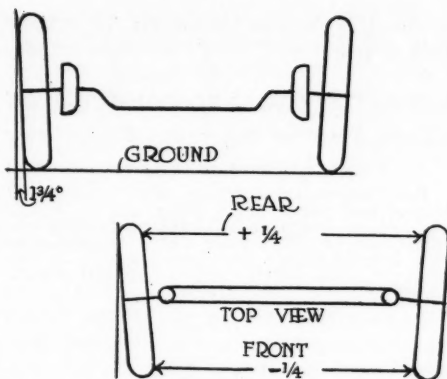


Fig. 2—Illustrating camber and gather on an Oldsmobile 43

performed the two functions of disengaging the clutch and applying service brakes.

For the benefit of Motor Age readers I wish to give the following information: Double pedal in doubt clutch action means when going from a high to a lower gear. The clutch is first disengaged and engaged again and the engine accelerates while gear is in neutral long enough for the gears to be turning at same relation to each other, when the clutch is again disengaged before shifting gear. When one performs double function of clutch and brake it is spoken of an interconnected.—James T. King.

#### Camber and Gather on Olds

Chicago—Editor Motor Age—Will you please publish a diagram showing the proper camber and gather for the front wheels of an Oldsmobile, model 43?—Inquirer.

The angle with the wheel with the ground is 1 1/4 degrees. Set the wheels in a way that the forward edge of the wheels are closer to the center from 1/4 to 3/8-inch than the rear edge. This is shown in Fig. 2.

#### Adjusting Rayfield Carbureter

Toledo, O.—Editor Motor Age—In answering the question of "A Reader," on page 45, of the January issue of Motor Age, on the adjustment of the Rayfield carbureter, I think Motor Age made a mistake. In testing for the low speed adjustment by pressing on the air valve with a pencil you state that if

the motor speeds up, the mixture is too rich, and should be adjusted by turning the low speed adjustment to the right for a leaner mixture. Pardon me for taking issue with you, but all adjustments on the Rayfield turn to right for a richer mixture. This might cause trouble for the reader.—Harvey Johnson.

1—This was an error, Mr. Johnson is right, and we stand corrected. All adjustments to Rayfield carbureters are to the right for richer mixtures and to the left for leaner.

#### SOME ELECTRIC SYSTEM POINTERS Detrimental to Motor-Generator to Remove Storage Battery—Adjusting Grant Axle

Berwick, N. D.—Editor Motor Age—Illustrate how to adjust the rear axle on a 1915 model T Grant Six.

2—Does it harm a battery to let it become fully discharged during the winter months and then have it recharged in the spring?

3—To what wires should I connect a Gray and Davis ammeter, which I want to install on a Grant Six, using the Allis-Chalmers single-unit lighting and starting system? Should it be connected to the battery or to the generator? Which side of the Gray and Davis ammeter is positive and which side is negative? They are not marked and I do not know how to distinguish them.

4—What is the cause of the rumbling noise in an Allis-Chalmers single-unit system? The chain which drives it is all right. When I take the fuse out and shut off the current the noise stops, and the noise occurs as soon as the fuse is put back.

5—Is it harmful to run a generator when the battery is taken out and the fuse is out? Will the fuse protect the generator by not being in?

6—Where can one secure books containing remedies on starting and lighting troubles?—A Subscriber.

1—Motor Age is unable to give you a diagram of the axle used on this car, but it was made by the Peru Auto Parts Mfg. Co., Peru, Ind., and doubtless if you write this concern you will be supplied with the necessary information. The axle is of the semi-floating type, however, and the general axle-adjusting directions published on page 30 of the November 11, 1915, issue. If you have not a copy of this, we will be glad to send you one. There are adjusting nuts either side of the ring gear so that the gear may be moved slightly either to the right or left as required, and there is also an adjustment on the pinion to move it forward or back. We believe the article referred to will entirely clear up the matter for you, however.

2—Yes, this treatment would harm the

BAUME HYDROMETER AND SPECIFIC GRAVITY EQUIVALENTS FOR LIQUIDS HEAVIER THAN WATER

Baume	Specific gravity	Baume	Specific gravity	Baume	Specific gravity
0.0	1.000	17.5	1.137	35.0	1.318
0.5	1.003	18.0	1.141	36.0	1.330
1.0	1.006	18.5	1.146	37.0	1.342
1.5	1.010	19.0	1.150	38.0	1.355
2.0	1.014	19.5	1.155	39.0	1.367
2.5	1.017	20.0	1.160	40.0	1.381
3.0	1.021	20.5	1.164	45.0	1.450
3.5	1.024	21.0	1.169	50.0	1.526
4.0	1.028	21.5	1.174	55.0	1.611
4.5	1.032	22.0	1.178	60.0	1.705
5.0	1.035	22.5	1.183	65.0	1.812
6.0	1.043	23.5	1.193	.....	.....
6.5	1.046	24.0	1.198	.....	.....
7.0	1.050	24.5	1.203	.....	.....
7.5	1.054	25.0	1.208	.....	.....
8.0	1.058	25.5	1.213	.....	.....
8.5	1.062	26.0	1.218	.....	.....
9.0	1.066	26.5	1.223	.....	.....
9.5	1.070	27.0	1.228	.....	.....
10.0	1.074	27.5	1.234	.....	.....
10.5	1.078	28.0	1.239	.....	.....
11.0	1.082	28.5	1.244	.....	.....
11.5	1.086	29.0	1.250	.....	.....
12.0	1.090	29.5	1.255	.....	.....
12.5	1.094	30.0	1.260	.....	.....
13.0	1.098	30.5	1.266	.....	.....
13.5	1.102	31.0	1.271	.....	.....
14.0	1.106	31.5	1.277	.....	.....
14.5	1.111	32.0	1.283	.....	.....
15.0	1.115	32.5	1.288	.....	.....
15.5	1.119	33.0	1.294	.....	.....
16.0	1.124	33.5	1.300	.....	.....
16.5	1.128	34.0	1.306	.....	.....
17.0	1.132	34.5	1.312	.....	.....

BAUME SCALE AND SPECIFIC GRAVITY EQUIVALENTS FOR LIQUIDS LIGHTER THAN WATER

Baume	Specific gravity	Baume	Specific gravity	Baume	Specific gravity
10	1.0000	37	0.8383	64	0.7216
11	0.9929	38	0.8333	65	0.7179
12	0.9859	39	0.8284	66	0.7142
13	0.9790	40	0.8235	67	0.7106
14	0.9722	41	0.8187	68	0.7070
15	0.9655	42	0.8139	69	0.7035
16	0.9589	43	0.8092	70	0.7000
17	0.9523	44	0.8045	71	0.6965
18	0.9459	45	0.8000	72	0.6930
19	0.9395	46	0.7954	73	0.6896
20	0.9333	47	0.7909	74	0.6863
21	0.9271	48	0.7865	75	0.6829
22	0.9210	49	0.7821	76	0.6796
23	0.9150	50	0.7777	77	0.6763
24	0.9090	51	0.7734	78	0.6730
25	0.9032	52	0.7692	79	0.6698
26	0.8974	53	0.7650	80	0.6666
27	0.8917	54	0.7608	81	0.6635
28	0.8860	55	0.7567	82	0.6604
29	0.8805	56	0.7526	83	0.6573
30	0.8750	57	0.7486	84	0.6542
31	0.8695	58	0.7446	85	0.6511
32	0.8641	59	0.7407	86	0.6481
33	0.8588	60	0.7368	87	0.6451
34	0.8536	61	0.7329	88	0.6422
35	0.8484	62	0.7290	89	0.6392
36	0.8433	63	0.7253	90	0.6363

battery. It should be kept as nearly completely charged as possible during the period that it is out of service.

3—Connect the ammeter into the main line between the starter-generator and the storage battery. The simplest way would be to disconnect the wire from either the battery or generator and run it to the ammeter, which you would mount on the instrument board. Then run another wire of the same size and insulation from the other terminal of the ammeter to the terminal to which the other wire was originally connected. In this way the total current passing between the battery and motor-generator goes through the ammeter. It will be a simple matter to determine which is the positive and which the negative of the ammeter by trial. After connecting it, if the instrument reads the wrong way, reverse the connections.

4—Sometimes generators develop a noise of this kind, which is due to some internal cause that usually cannot be remedied. Unless this interferes with the performance of the unit, it would be advisable to let it alone, but should the generator become defective, we would advise your sending it to the Allis-Chalmers Mfg. Co., Norwood, O., for repair. First make sure that it is not a chain noise, due to improper chain adjustment.

5—Yes, it would injure the generator whether the fuse were removed or not. With the battery disconnected, there would be no outlet for the generated current regardless of the fuse.

6—One of the best little books we know of dealing with troubles in starting and lighting systems, is that published by the Electric Auto-Lite Co., Toledo, O., and entitled A Handbook on Automobile Electric

Systems. You can secure one by writing this concern.

#### REMOVING OAKLAND CONE CLUTCH Gearset Must be Taken Out First—Other Details Given

Des Moines, Ia.—Editor Motor Age—Will Motor Age please print directions for taking out a cone clutch on an Oakland touring car, model 35; how to replace clutch leathers, and also how to adjust high speed gear? A diagram of cone clutch will be greatly appreciated.—J. H. Freudenbery,

In order to take out the clutch, it will be necessary to remove the gearset first. Disconnect the drive shaft at the universal joint that is just back of the gearbox, after having removed the gearshift connections. Then unbolt the gearbox at the front of the bell housing, where it attaches to the housing that goes around the flywheel. This will let you get at the clutch cone itself, and that can be unbolted from the casing that contains the clutch spring. One hint that should not be overlooked, is, to be sure to tag each part as you take it out, so as to make sure you get the right piece back in the right place, and in the right way. Of course, if you are sure you know how to do it and replace the parts this will be unnecessary. To remove the old clutch leather, cut the heads of the rivets off with a sharp cold chisel or similar tool. When putting on a new leather facing, first soak the leather in kerosene or neats-foot oil and then stretch it tightly over the cone. Drive the rivets well home and clinch them securely on the under side of the cone. Be careful to see that the heads of the rivets are driven well down below the surface of the leather to avoid grabbing. We do not know exactly what you mean by adjusting the high speed gear.

There is no adjustment provided for this in any gearset, and it is hard to see what there would be to adjust. The connection for high speed is through a form of dog clutch, and it may be that this is worn out, preventing it from staying in engagement. In that case the gear would have to be replaced. If the plunger holding the gear shifting rod in place is not acting properly, this might cause it to slip out of engagement. The spring pushing the ball into the notch to maintain the proper position may be stuck. This is simply a matter of repair, however. Diagram of the clutch used in the Oakland 35 is shown in Fig. M.

#### MAGNETIC RECTIFIER ON FORD Would Not be Practical Because of Fluctuation of Current

Roxbury, O.—Editor Motor Age—I understand that the France Mfg. Co., Cleveland, O., is making a magnetic rectifier it calls the F. F. magnetic rectifier for charging storage batteries by an alternating current.

1—Would it be possible to install this rectifier on a Ford car and charge a storage battery from the Ford magneto? If so, would it be practical and would it be injurious to the magneto?

2—If practical and not injurious, would it be practical to install a Gray & Davis starting motor in connection with it?

3—Would it be advisable or necessary, to use a Ward-Leonard regulator in connection with it?

4—Kindly furnish a wiring diagram of complete charging, lighting and starting circuits complete with ammeter.—H. T.

1—The F-F magnetic rectifier will not operate on the current furnished by the Ford magneto, because the frequency of alternations of the current varies with the engine speed and not constant. The rectifier is designed to operate on the constant 60-cycle alternating current supplied by 90 per cent of the power and light companies of this country. In this connection we might add that the France Mfg. Co. experimented with the electrolytic rectifier, consisting of a carbon and aluminum electrode, in a bi-carbonate of soda solution, which acts as a check to the negative alternation of the current and operates independent of frequency, but the aluminum eats away so fast and the current obtained is so small that it takes too long to charge a battery, which together make this method of practical failure.

2—It would be practical to install a Gray & Davis starting motor and have the battery charged, when necessary, from an outside source of current by means of the F-F rectifier.

3—It would not be necessary to use a Ward-Leonard regulator in connection with it.

4—See Fig. 3 for wiring diagram for the starting, lighting and charging circuits.

#### G. & D. Fuse Blows Out on Ford

Graham, Tex.—Editor Motor Age—I have several Ford cars equipped with Gray and Davis starters and several seem to have trouble with the fuse blowing out. The lights don't seem to be shorted anywhere.—A Reader.

1—This can be charged to either one of three causes: either the wiring of the system is temporarily in contact with the frame or ground, for which reason it is difficult with instruments to determine

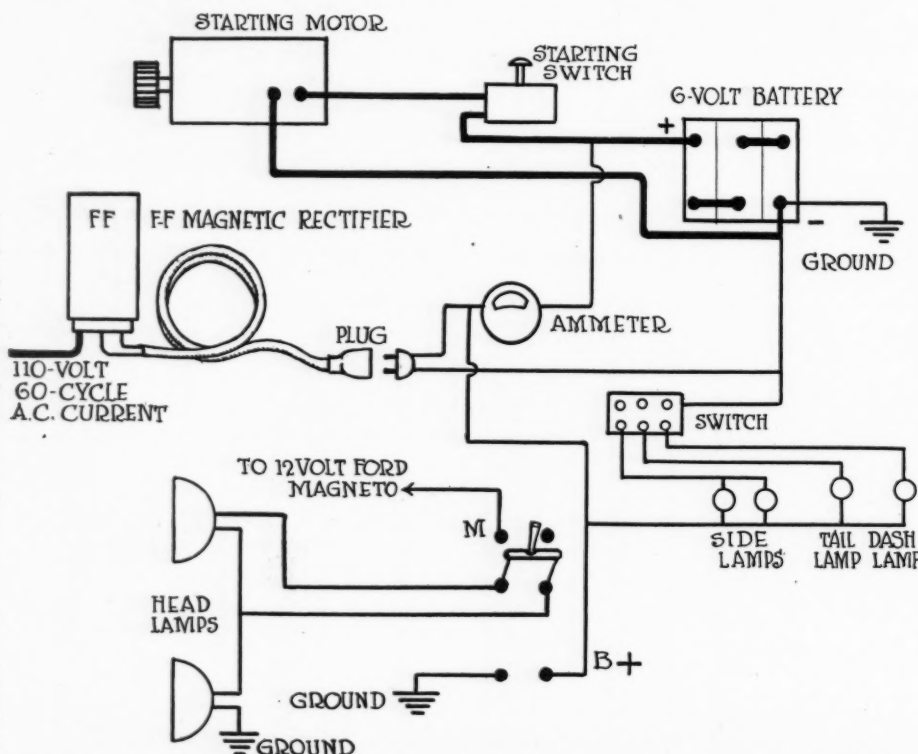


Fig. 3—How magnetic rectifier might be used in connection with the charging of storage batteries



whether a short circuit exists; or a short circuit in the armature windings may be in evidence only at critical speeds; or it may be that the cut-out does not open early enough when the engine slows down, in which case reversed current from the battery blows the fuse. Should examination show the difficulty be attributed to this cause, the regulator cut-out should be removed and returned for readjustment to the Gray & Davis factory, Boston, Mass.

#### SOME FACTS ABOUT MAXWELL 25 Lost Rotating Motion in Rear Wheel and Steering Gear

Angola, Ind.—Editor Motor Age—What oiling system was used on the 1915 Maxwell 25?

2—I have one of these cars and expected to have to use a wheel puller to remove the back wheels, but one came off quite easily with a little encouragement. The key in the shaft seems loose and there is some rotative motion between the wheel and shaft. Should a new key be fitted? How is the wheel replaced on a tight key and shaft?

3—Illustrate the steering gear and its adjustment on this car.

4—How may the bearings on the front and back wheels be removed for inspection?

5—What is the method of tightening the cone clutch?—A Reader.

1—The oiling system used on the 1915 Maxwell was a constant level splash.

2—It probably would be cheaper for you to have an oversize key made to replace the old one. This would take care of the play now in the wheel. If you do not want to do this there is only one other thing to do—put in a new rear axle shaft and hub. This would be rather expensive, however.

3—A part of the steering device is shown in Fig. 5. There is a large nut at the top of the steering gear case that takes care of the end play. If there is play in the gears, then the pin can be taken out of the eccentric bushing and this bushing tightened to take care of the play, then replace the locking pin.

4—To remove the bearings from the front wheel, drive out the cup containing the balls and the bearings may be inspected. The rear wheel bearings are roller. Remove the dust cap and the bearings may be lifted out by hand.

5—The tension of the clutch is regulated by three bolts in connection with three springs. Tightening the nuts on the bolts gives the springs greater tension and this can be gauged to suit the will of

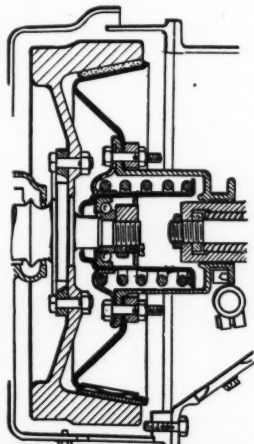


Fig. 4—Clutch on the Oakland

#### Communications Received and Inquiries Answered

A. J. Routhier.....Orlando, Fla.  
A. D. Hass.....Massbach, Ill.  
J. T. King.....Grand Forks, B. C.  
Inquirer.....Chicago  
Harvey Johnson.....Toledo, O.  
A. Subscriber.....Berwick, N. D.  
A. Reader.....Graham, Tex.  
J. H. Freudenbery.....Des Moines, Ia.  
H. T. ....Roxbury, O.  
A. Reader.....Angola, Ind.  
Samuel Doyle.....Lincoln, Ill.  
Harry Werron.....Pittsburgh, Pa.  
A. Reader.....Toppenish, Wash.  
James E. Brown.....Mayburg, Pa.  
No communications not signed with the inquirer's full name and address will be answered in this department.

the operator. Be sure, however, that the clutch pedal is not resting on the floor boards of the car, after adjustment is made.

#### MAGNETO CURRENT FOR TAIL LIGHT? Would Go Out When Engine Was Not Running on Ford

Lincoln, Ill.—Editor Motor Age—I have a 1915 model T Ford. The headlights are off the magneto. Could I light the tail light from the magneto, or would it be too much of a load for the magneto or injure it in any way?

2—If it is possible to do it, how should I run the wires? I suppose attach one wire to the magneto contact on the engine, run it to the switch, from the switch to the tail lamp and from the lamp to the ground. If this is not correct, please so state.

3—What size lamp is needed?—Samuel Doyle.

1, 2 and 3—It hardly resolves itself into a question whether the magneto would be overloaded by taking current for the tail light. As you probably know, the Ford has no storage battery, and therefore, when your engine stops your current supply stops, and the lights go out. Laws make it imperative that tail lights be kept burning at all times after night, when the car is moving, or standing in the street. You can readily see that the tail light would not burn when the engine was not running.

#### Anent Making Overland a Truck

Pittsburgh, Pa.—Editor Motor Age—Received your communication in regard to my inquiry of Winton six dated January 10, 1916, and same will be very much appreciated when published. Am making a 1912 Overland car into a truck and would like Motor Age's opinion on changes I wish to make, also bore and stroke, valve setting, compression and back gear ratio of same. Wish to change back gear ratio to 4½ to 1 and use aluminum pistons on engine. Should valve setting and camshaft be changed, and what changes would you recommend for a speed of 50 miles per hour, as I wish to use this truck for emergency trips and would like same speedy and good on hills.—Harry Werron.

The only change Motor Age would suggest in this case would be the fitting of the aluminum pistons. Put some kind of non-leak rings on them and you would increase the power enough, and also tend to raise the possible speed. It would be alright to put in a 4½ to 1 gear combination, although you would probably have some trouble doing it. Thoroughly overhaul the engine and with everything in good shape, it should attain the speed you desire, or pretty close to it.

#### Timing a 1914 Apperson

Toppenish, Wash.—Editor Motor Age—Please explain method of timing the valves on the 1914 Apperson 4-45.—A Reader.

Inlet valves open on top of dead center. Inlet valves close 45 degrees past bottom

center. Exhaust valves open 45 degrees ahead of bottom center, and exhaust valves close on top center.

#### THE ATWATER KENT UNISPARKER Reader Also Wants Formula for Finding Piston Displacement

Mayburg, Pa.—Editor Motor Age—On the Chalmers 6-40 model 32, with the motor standing in lifting the distributor block from the Atwater Kent type K unisparker, if one slightly turned the shaft until it clicks, and as it cannot be turned back, would this have any effect on the firing order, if so how would one adjust it back to the former position?

2—What is Earl Cooper's address?—James E. Brown.

The unisparker should be installed so as to allow a small amount of angular movement for the initial timing adjustment. In other words, the socket into which the unisparker fits, should be provided with a clamp, which will permit the unisparker to be turned and locked rigidly in any given position. In timing, the piston in No. 1 cylinder should be raised to high dead center, between compression and power strokes, then, with the clamp which holds the unisparker loose, the unisparker should be slowly and carefully turned backwards or counter clockwise until a click is heard. This click happens at the exact instant of the spark. At this point, clamp the unisparker tight, being careful not to change its position. Now remove the distributor cap, which fits only in one position, and not the position of the distributor block on the end of the shaft. The terminal to which it points is connected to No. 1 cylinder. The other cylinders in their proper order of firing are connected to the other terminals in turn, keeping in mind the direction of rotation of the timer shaft. When timed in this manner the spark occurs exactly on center, when the engine is turned over slowly. At cranking speeds, the governor automatically retards the spark for safe starting and as the speed increases, the spark is automatically advanced, thus requiring no attention on the part of the driver. If spark lever is used in conjunction with the type K unisparker, proceed the same as for type H, except that the spark control levers should be arranged so that the unisparker moves not more than ½ inch from the full retard position to the full advance.

2—Earl Cooper's address is Los Angeles, Cal.

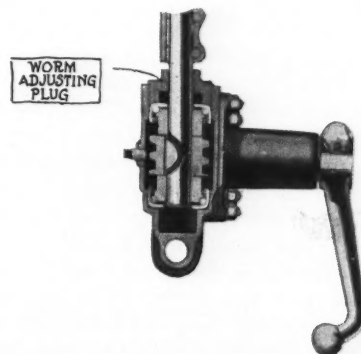
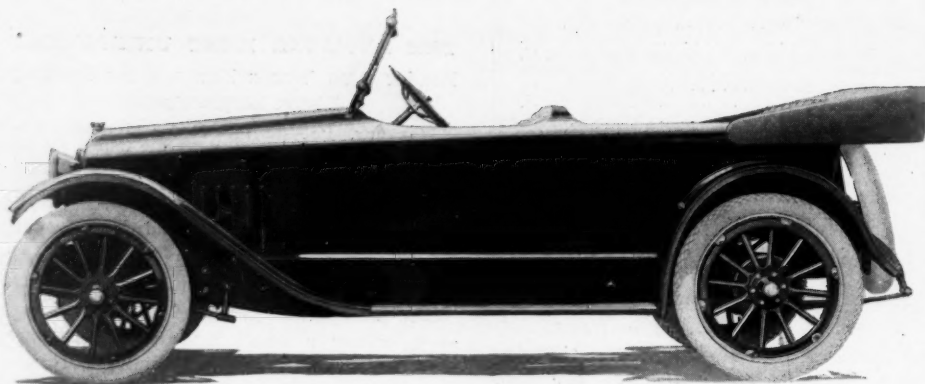


Fig. 5—Maxwell steering gear adjustment

# New Detroit Six Shows Radical Change in Design

Is Made Only in Five-Passenger Touring Form—  
Equipment Complete



THE new Detroit Six-45 is the latest creation of the Detroit Motor Car Co., Detroit, Mich. Departing radically from the lines that heretofore have been adhered to in the design of cars of this name, this new six is indeed most attractive, and possesses such features of modern exterior outlines as the double cowl, the sweeping slope of body and hood, and the slanted windshield, which this year's shows indicated to be a most popular trend.

Built upon a chassis of 118 inches wheel-base, this six makes use of the latest ideas in mechanical construction as well, for it utilizes the slanting frame, the unit attachment of motor and gearbox, and the Hotchkiss type of drive through the semi-elliptic rear springs, which are hung under the axle. The motor is a standard Continental block-cast type, with the cylinder head detachable.

## Cylinder $3\frac{1}{4}$ by $4\frac{1}{2}$ Inches

Cylinders are  $3\frac{1}{4}$  inches in diameter and the stroke is  $4\frac{1}{2}$  inches, giving 25.39 horsepower by the N. A. C. C. rating, although the power is said to come to 38 on the block at 2,000 r.p.m. The displacement is 223.95 cubic inches, and the stroke-bore ratio 1.38. The cylinders and upper half of the crankcase are cast in one piece, and this feature alone lends greatly to the smooth and simple outer appearance. The detachable head, attached in the usual manner, forms the outlet water connection to the radiator, also carrying the spark plugs and priming cocks as well as the fan bracket at the front. Valves are on the right, and of course, completely housed in, but the carbureter is bolted high on the left center of the casting, so as to make it easy to get at and simplifying the control. Passage for the transfer of the fuel across to the intake ports are cored through the water jackets. Nothing else is placed on the left except the starting motor and the breather and oil gauge. On the right are the exhaust manifold, the generator and the water pump.

From the figure mentioned above, it will be noted that this engine is of the moderately high-speed type, and throughout the internal construction this idea has been carried out by balancing the rotating and

reciprocating parts and making them as light as possible for the work they have to do. The crankshaft is a three-bearing type that has  $2\frac{1}{2}$ -inch main bearings and  $2\frac{1}{4}$ -inch crank-pins. The rods are long and drop-forged from .35 carbon steel. Timing gears are helically cut, and the timing gear is made of specially-prepared silk to insure quiet operation—a refinement that has been very quietly developed by motor engineers and which does much for the cause of silent motor operation.

The Ball carbureter is used, and the fuel is drawn from an 18-gallon tank, suspended at the rear of the chassis, and delivered by the Stewart vacuum feed apparatus. Connecticut battery ignition is another feature, the distributor being mounted on the right forward side of the engine. Auto-Lite starting and lighting have also been well-applied, the starting unit hugging close to the flywheel housing on the left and connecting to the flywheel teeth by the now extensively-used Bendix scheme for automatically meshing and demeshing. The generator is driven off the end of the centrifugal pump shaft through a coupling that is designed for silence at all times. The electric system is of the single wire type with grounded return circuit.

## Clutch and Gearset Compact

Clutch and gearset assembly are compactly arranged to bolt to the flywheel housing by a regular form of bell construction, and they are designed in conformity with good and conservative practice. Five driving steel plates and six driven plates that are faced with Raybestos, make up the clutch assembly that requires no lubrication save at the bearings. The gears have a  $\frac{3}{4}$ -inch face, and are made of crucible nickel steel, case-hardened, heat-treated and ground. They should, therefore, resist any driving strains to good advantage. Here is a point where wear must undoubtedly be specially guarded against.

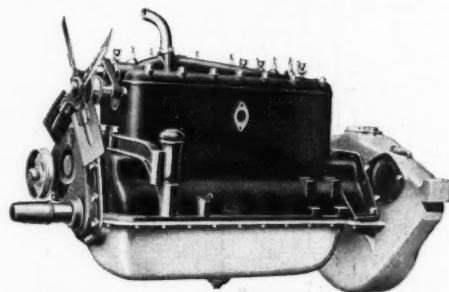
It is doubtful if greater simplicity could be worked out in the construction of the chassis back of the power unit than has been found possible in this Detroit. This is especially due to the elimination of

either a torsion tube or torque rod by the use of the Hotchkiss drive. Thus simply a plain drive shaft, fitted with a universal at either end, spans the distance from gearbox to rear axle. Even the conventional brake equalizers are absent, a unique adaptation of pulleys and steel cables taking their place. The top view of the chassis will show this feature clearly. Running part way back from the foot-brake and emergency lever are two rods that terminate at pulleys through which the steel cable passes. The ends of the cable attach to the levers on the brake operating rods that are attached to the axle housing.

## Rear Axle Floating

A pressed-steel housing, ribbed at top and bottom externally, is used in the construction of the floating rear axle. The axle gears are of the spirally-cut variety now so universally used, and the whole differential unit operates on ball bearings, with roller bearings in the wheels. The rear cover is made as large as possible, so that it is easy to get at the gears for adjustment or other purposes. In order to be amply strong, especially in the case of the rear set, which has to take the drive and torque, the springs are made of chrome-vanadium steel. Riding qualities are fostered by making them long and flat, the rear pair measuring  $52\frac{1}{2}$  inches, and the front 36 inches. The rear pair are substantially hinged to frame brackets at the front end, and are shackled at the rear to the bent-down back ends of the side members of the frame. Although underslung from the rear axle, the car nevertheless has a road clearance of 10 inches.

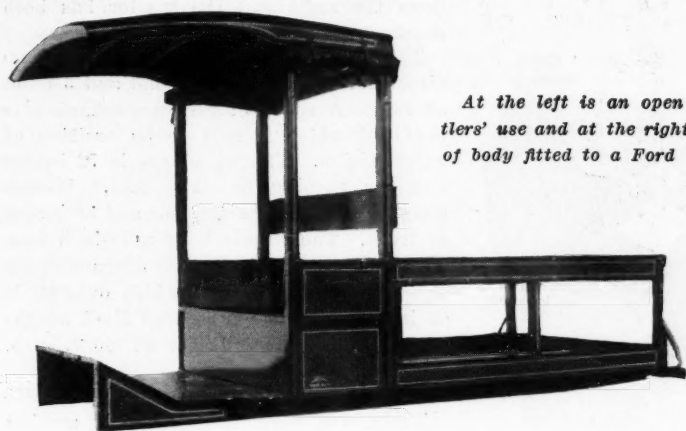
At the present time only the five-passenger touring body is offered, and it carries complete appointments and equipments in every respect. The upholstery is leather, and the tires are 33 by 4 all around, the rear set being of the non-skid variety. Special fittings, such as a tonneau windshield, Moto-Meter or wire wheels, can be had at extra cost.



Showing detachable head and clean outward appearance of Continental motor used in Detroit six



# Rock Hill Buggy Co.'s Commercial Bodies for Ford Cars



At the left is an open body for bottlers' use and at the right a closed type of body fitted to a Ford



## These Include Several Styles and Designs from Open to Jitney Buses

COMMERCIAL bodies for Ford cars are being manufactured by the Rock Hill Buggy Co., Rock Hill, S. C., in a number of designs to meet the needs of various classes of users. Two of these bodies are shown on this page. The closed type has a loading space of 39 by 60 inches and weighs approximately 315 pounds. A cushion is made of leather, the back of the seat folds down, and there is ample room under the seat for tools or other articles to be stored. The other illustration is of a body made for the use of bottlers. This holds 20 standard cases, is strongly braced and has a rolled curtain around the driver's seat. The loading space is 39 by 60 inches and the approximate weight 240 pounds.

Among others in the line are a panel body built of ash with doors in the rear; a curtain side body also built of ash and the sides, back curtains and roof made of black oiled duck; an open body with flare boards and drop tail gate; an express body with canopy top and curtains, and a jitney body offering 60 inches of space back of the driver's seat and having 2 seats running lengthwise.

### WORKING ON JACKSON HIGHWAY

Nashville, Tenn., Mar. 11—Counties through which the Jackson military highway is routed are working during the winter in order to have the road in touring shape by the end of 1916. An effective organization has been formed in both Mississippi and Tennessee in order to have the part of the highway ready for inspection of the official pathfinders. Lamar and Marion counties, Alabama, have almost completed their section of the road and are at work on the remainder. Franklin county, in the same state, has funds on hand and will push construction on its link.

### ORGANIZE TIRE SERVICE ASSN.

Indianapolis, Ind., March 10—At a meeting held in Indianapolis last week the National Tire Service Association was or-

ganized with a large and representative charter membership. Roy E. Warner, of Roy E. Warner Co., of Louisville, Ky., was chosen president of the organization, F. C. D. Dobson, St. Louis, Mo., secretary, and B. O. Leftwich, St. Louis, Mo., treasurer.

The objects of the association provide

for co-operation of members in interchanging service, extending credit and encouraging uniformity in giving efficient and economical tire service.

The next meeting will be held April 15 in Louisville at the Seelbach, and by-laws and a constitution will be adopted.

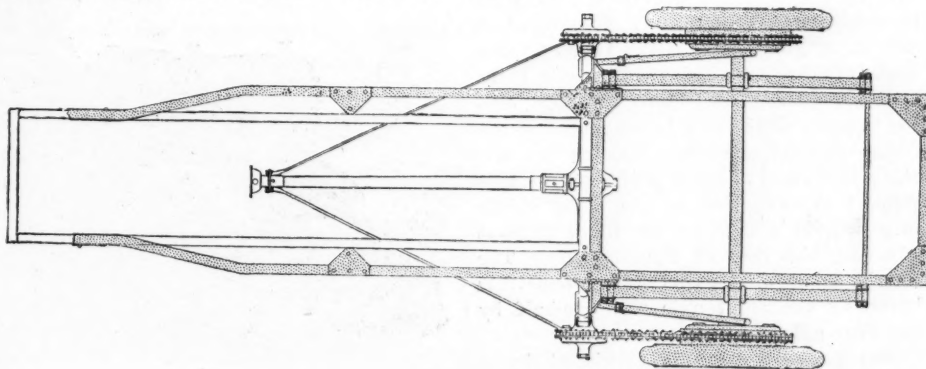
## Simplex Truckform Make Ford a 1-Ton Can Be Converted in Very Few Minutes

A FRAME for converting a Ford car into a one-ton truck is made by the Simplex Truckform Co., Chicago, in which it is said the only tool necessary for the conversion process is a monkey wrench. The truck form attached to the chassis of the Ford car is of sufficient length to allow the use of any style of truck body suitable to the needs of the user. The material used in the attachment is of sufficient strength and so designed so as to carry a 50 per cent overload. It is so proportioned that it leaves 90 per cent of the load to be carried on the axle of the truck form, which has the regular truck type of wheels fitted with solid rubber tires.

The chassis of the Ford is not dismantled in any way. The rear wheels are

removed and small sprockets applied. The rear axle then becomes a jackshaft supported by cast steel arms at each end, these arms being riveted to the frame of the truck form. Quick action clamping devices are used which enable one to attach or detach the device in a very few minutes.

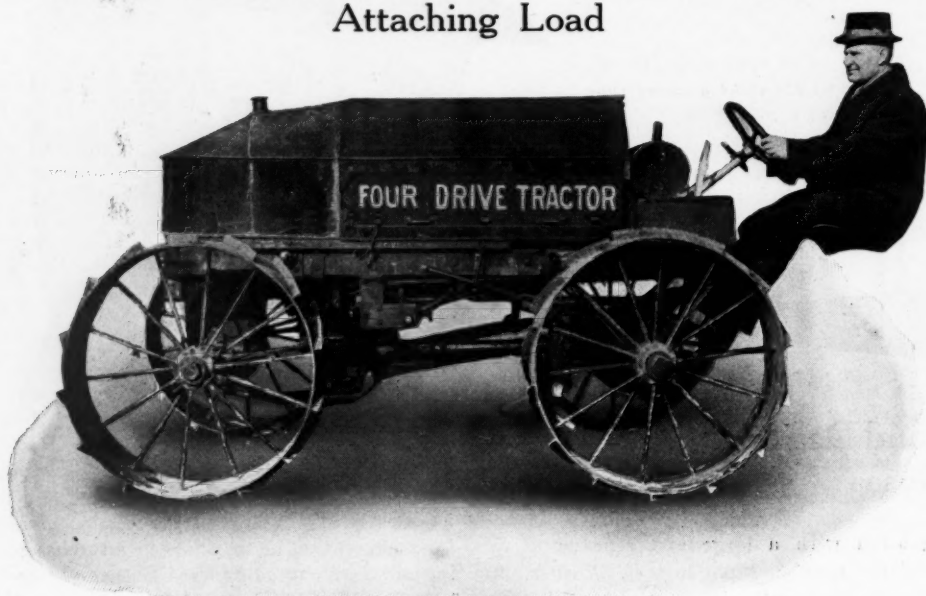
The carrying capacity of this truck form is 2,000 pounds. The length of the frame is 165 inches and the width 34 inches. Semi-elliptic springs 44 by 2 inches are used and the tires 32 by 3½. The gear ratio on the sprockets is 24 to 5 and the final gear ratio 7 to 1. Drive is by heavy roller chain, brakes are double emergency, wheelbase is 127 inches and weight about 1,000 pounds. It sells for \$325 f. o. b. Chicago.



Simplex Truckform for converting a Ford into a 1-ton truck

# New Tractor Drives On All Four Wheels

## Another Unique Feature Is Found in Method of Attaching Load



*Four-wheel drive tractor, a Michigan product*

SOMETHING new in the way of tractors is being made in the Wolverine state—the tractor that drives on all four wheels. This is the product of the Four-drive Tractor Co., Big Rapids, Mich. The tractor has a differential front and rear and with power on all four wheels less weight is necessary to obtain traction than would be the case were the drive only in the rear. The machine is close-coupled and in road tests has pulled more than ten times its own weight on wheels. Tests have been going on for over a year and it has been shown that one of these tractors will handle two or three 14-inch plows in sand, clay or swampy lands without difficulty. It is said to be impossible for one wheel to spin unless all do. In the hardest pulls the loads are attached not to the rear axle, but to the draw bar which comes from the center of the tractor frame. It is said that whereas those tractors pulling from the rear have a tendency to lift the front end, with this tractor the harder the pull the harder it sets itself into the ground.

### Secret in Front Axle

In the front axle of the four-drive tractor lies the secret of the machine. This axle is fitted with a differential allowing it the same freedom in turning corners and on rough ground as the type of axles used in motor cars today. The axle turns freely in heavy-duty ball bearings and the housing of the axle is connected to the frame through a swivel, making the machine supported at three points only. This support allows either of the front wheels to pass over a high or low place without affecting the rest of the machine. The weight is so distributed that one-half is borne by the front axle and one-half by the rear axle.

The motive power is furnished by a 35-horsepower Waukesha engine. This is

a low-speed, heavy-duty type. The front axle is a patented driving member, while the rear is the usual worm-driven type. The differentials are bevel gear and final drive is taken through a single solid

final drive is taken through a single solid shaft connecting both the front and rear axle. There are no universals. Drive is from the right and the tractor has both hand and foot throttle control.

The tractor has a speed of 8 miles on direct drive, 5 miles on second and 3 miles on first. A special steering mechanism is provided which is said to be positive of quick action. The wheelbase is 72 inches and the turning radius 8 feet. Wheels measure 42 inches in the rear and 36 inches in front. The wheels have a 12-inch face on which are placed 1½-inch diagonal driving cleats. The extreme width over all is 68 inches and with the tanks filled weighs 3,000 pounds. It sells for \$1,000 f. o. b. the factory.

### Speed 8 Miles Per Hour

There are very few exposed moving parts, all gears being incased and running in oil. As to economy in fuel, it is said that in plowing and harrowing tests the tractor has consumed a little over 1 gallon of gasoline per hour, during which time it traveled 3 miles, pulling three 14-inch plows and plowing approximately 1 acre of land.

### WEEKS RESIGNS FROM STUDEBAKER

South Bend, Ind., March 11—D. M. F. Weeks has resigned as sales manager for the Studebaker Corp., South Bend, Ind., his resignation effective April 1. He will continue as a director in the corporation. Mr. Weeks has been connected with the

# Sterling-Kindling Street Washing Machine

## Combination of Truck and German Squeegee

THE Sterling Motor Truck Co., Milwaukee, Wis., recognizing the demand for more efficient street cleaning equipment, has designed and built the Sterling-Kindling motor squeegee street washer shown below. This is a combination of the Sterling worm-driven chassis and the more or less well known Kindling squeegee appliance, which was developed a number of years ago in Germany and brought to this country and manufactured in recent years by the Kindling Machinery Co., Milwaukee, Wis., but in the horse-drawn type only.

The name Sterling-Kindling explains the combination of the truck and attachment. This street washer has a tank capacity wash from 4,000 to 5,500 square yards of pavement, depending upon the condition of the street.

Provision also is made for the quick removal of the tank for converting the machine into a general utility vehicle for equipment either with a stationary or automatic dumping body.



*Sterling-Kindling motor-driven squeegee street washer*



Studebaker interests for a long time. For 8 years he was manager of the company's branch at Kansas City, Mo. From that place he came to South Bend 4 years ago and during that period has devoted his time to the exclusion of nearly all else to building up the sales end of the business and has met with notable success.

#### NEW PLANS FOR GRANT

Findlay, O., March 13—In order to obtain additional working capital, the Grant Motor Co. has been reorganized and all of its property and assets taken over by the Grant Motor Car Corp., a Virginia corporation, having a capitalization of \$1,000,000 preferred stock, and \$2,000,000 common stock. The new company takes over all the rights and liabilities of the old company and is the assignee of all its contracts.

#### OHIO CONVICTS TO MAKE TAGS

Columbus, O., March 11—If present plans are carried out, prisoners at the Ohio penitentiary will be making the license tags for 1917 within a few months. The chance of giving work to idle prisoners and thus saving the state thousands of dollars annually, will not be made by either Governor Willis or the secretary of state, but will be done by the board of administration.

The expense of installing the necessary machinery for the manufacture of all the license tags needed by the state, will not exceed \$10,000, and several times this amount will be saved the first year. Besides the big saving thus entailed, work will be furnished to more than a score of prisoners now confined in the idle house of the institution.

It is planned by the administration board to not only make the tags, but do most of the filling of orders at the penitentiary. The new state building is amply large to accommodate the headquarters, and prisoners could be employed to do the packing and shipping and thus thousands of dollars could be saved annually.

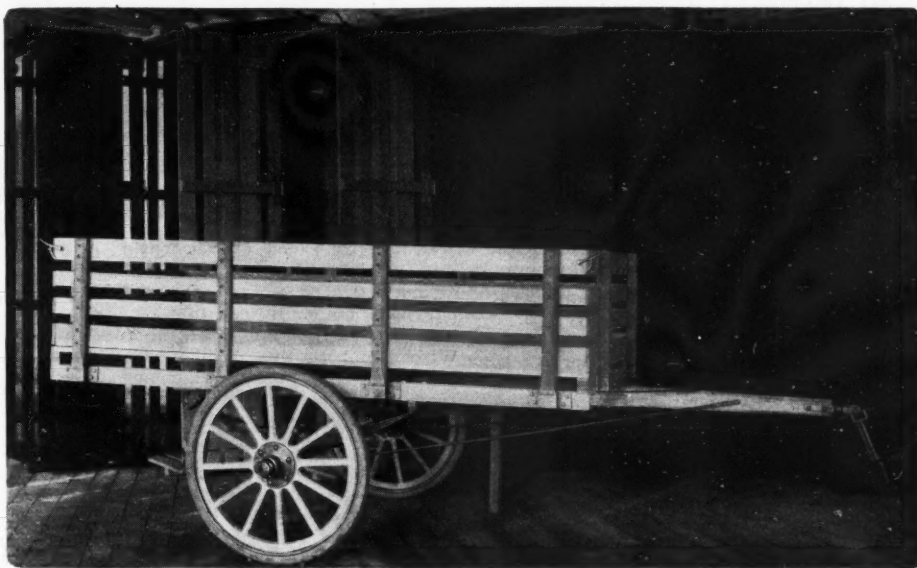
#### MUCH MONEY FOR ROADS

Washington, D. C., March 11—One hundred and fifty million dollars will be expended in country-wide road improvement during the next 5 years, if the co-operation between the national government and the several states set forth in the measure reported to the senate by its committee on post offices and post roads as a substitute for the Shackelford house good roads bill finds approval.

Senator Bankhead's committee dissented from the legislation passed in the house in that it preferred a definite sum per year rather than "any amount up to \$25,000,000;" believed that the money should only be expended for construction or improvement and not for maintenance; and also included in the distribution to the several states the additional factor of area, besides population and post road mileage.

## Matco 1-Ton Trailer a Michigan Product

Detroit Concern Brings Out Auxiliary in Two Body Styles



The Matco trailer, in which two body styles are offered

THE trailer which the Michigan Auto Trailer Co., Detroit, Mich., recently placed upon the market, is called the Matco. It is of strong white oak, having been selected by the company as being best suited for the chassis. The axle is a 1½-inch Timken, having Timken roller bearings. The wheels are of the artillery type, 32 by ½, and are fitted with Swinehart, solid rubber, truck type tires, 32 by 2 inches. The springs are semi-elliptic, having eight leaves.

There are two types of bodies, either a closed body 8 feet long, 47 inches wide and 14 inches high, with flare boards, or an open stake body, also 8 feet long and 47 inches wide, but 24 inches high. This type of body has removable side and end gates, the latter having four boards, the top and bottom ones 4 inches wide and the two middle boards 3 inches wide. The carrying capacity is in excess of 2,000 pounds. The color is either black or gray. The total weight of the trailer is about 475 pounds. A reinforced pole connects the trailer with the car axle through iron truss-rods, equalizing the pull.

#### NEW YORK REGISTRATION INCREASE

New York, March 11—Motor car registrations in this state increased 36 per cent in 1915 over the preceding year. Chauffeur licenses increased 21 per cent and the amount of money paid by owners increased 24 per cent. With the money from fines included, the total from the operation of motor vehicles to be set apart in 1916 for the maintenance of improved highways will be close to \$2,000,000.

All told, motoring credentials were issued to 316,185 persons. Of this number, 231,831 were owners, representing 208,421

passenger cars and 23,411 commercial vehicles; 82,153 chauffeurs were licensed and 2,201 dealers received certificates.

The fees aggregated \$1,913,175. The 1914 credentials totaled 235,602; passenger cars, 151,030; trucks, 17,193; chauffeurs, 66,636; dealers, 1,743. The fees amounted to \$1,529,852.

#### HOLDS STAGES COMMON CARRIERS

Phoenix, Ariz., March 10—In what is believed to be the first order of its kind ever issued in the United States, the Arizona corporation commission holds motor stages to be common carriers and lays down rules and regulations, and prescribes fares, for stages operating between Phoenix and Globe, Ariz.

The order declares that "financially irresponsible competition" has demoralized the stage business between Phoenix and Globe. Rates have been cut below the point where the business is profitable. Some of the rate-cutters have quickly gone out of business but it has been made very difficult for the responsible stage companies to collect fares.

The one-way fare for the trip of 128 miles, via the Roosevelt dam, is made \$10, and the round trip rate \$18. Fares to intermediate points are in proportion.

Each person or firm operating a motor stage line over the Globe-Phoenix route must file a bond of \$2,500 with the commission for the first car, and a bond of \$1,000 for each additional car.

This order is signed by Commissioners F. A. Jones and W. P. Geary. Commissioner A. W. Cole issued a dissenting opinion, stating that one company was handling passengers at \$5 apiece each way.

# From the Four Winds

**WATCH Your Oil**—While overhauling an old two-cylinder Maxwell car, E. E. Booth of Pomona, Cal., found in the crank case a sizable chunk of refined gold which had apparently been once the crown of somebody's tooth. Its presence in the oil and other residue has not been explained.

**Refurbish Old Tags**—Mayor Filbert, Reading, Pa., has sent to the state highway department what purports to be evidence that certain Philadelphia dealers in used cars have colored up their old 1915 licenses so as to resemble 1916 tags. This was disclosed by a number of orange tags bearing numbers over 150,000, whereas they are at present far below that figure. Several were confiscated.

**Oldest Motor Car Driver**—Senator J. E. McComas, Pomona, Cal., is, perhaps, the oldest man in the country who drives a car throughout the year. Although Mr. McComas is past 82, he still is actively engaged in business, and never misses a day at his office, to which he drives in his car. The senator drove an ox team into California back in '53, but he believes that every man who can afford it ought to buy and use a motor car.

**Large Increase in N. J. Licenses**—Registrations in New Jersey during the first 2 months have shown a large increase over the same period in 1915. To February 29, the collections of the department of motor vehicles amounted to \$726,633.26, as compared with \$526,613.83 in the same period in 1915, an increase of over \$200,000. During this period the department has registered 56,012 cars, and 114 trailers. Drivers' licenses numbered 66,983, and transfers recorded were 862.

**Georgia Motorists Must Get License**—One hundred and forty-eight sheriffs in Georgia have pledged their support to secretary of state in the enforcement of the license law. There are only three counties in the state whose sheriffs have not pledged themselves to the vigorous support of this law. As these three counties have not been made public a motorist without a license now has about as much chance as a snowbird in Haiti. Georgia motorists have been rather negligent in getting licenses in the past.

**New Plan for Litigation Expense**—Judge Joseph E. Cordes, Socialist member of the Civil Court bench at Milwaukee, Wis., proposed in court last week that the license fee for motor cars be raised from \$5 to \$50 a year and the difference turned over to the counties of Wisconsin to bear the expense of trials of cases growing out of motor car accidents. Judge Cordes claims the civil courts are congested with motor car cases and believes motorists in general should bear the extra expense by the payment of larger license fees. He has no suggestion as to licensing or taxing pedestrians to share part of the expense, although the pedestrian is generally responsible for the litigation.

**Racine, Wis., Garages Organize**—The Racine Garage Owners' Association, Racine, Wis., was formally organized last week with fifteen charter members at a meeting called by C. F. Chase, national organizer for the American Garage Owners' Association. The organization consists exclusively of owners of garages and dealers who operate garages in connection with their sales business. The association will meet on the first Monday of each month at the Hotel Racine, which has offered its convention hall

free of charge. Officers of the new Racine branch are: President, M. E. Laux; first vice-president, Robert Zastrow; second vice-president, Clarence Burkert; secretary and treasurer, Charles A. Myers.

**Martyr to Patriotism**—Word has been received of the death of C. M. Eastlake, formerly Maxwell district salesman at Winnipeg. Mr. Eastlake, a native Canadian, left his work to serve his country as a soldier. He was wounded and died in a hospital at Liverpool.

**Road Hog Fined in Wisconsin**—Although the gradual disappearance of prejudice among farmers toward the motorist long has been noted, it was found necessary to invoke a statute aimed at the road hog in Wisconsin recently. William Paape, Grand Rapids, Wis., while driving on a country road, encountered Herman Schlosser, a farmer, driving a wagon, who refused to share the highway with him. Schlosser

kept to the middle of the road for 2 miles and finally allowed Paape's machine to pass. Paape swore out a warrant for the farmer's arrest under a law passed by the 1913 Wisconsin legislature covering just such cases, and Schlosser was fined \$10 and costs in police court.

**Gold Paint for Motor Cars**—When F. E. Runner, Billings, Mont., ordered a Franklin touring car last summer, he gave instructions that it be painted a gold color, his idea being that that was the best color to disguise the tint of Montana dust. Experience during the last few months has demonstrated the soundness of his idea, and many of his friends in Montana have since had their cars painted the same unique color.

**Association Changes Name**—The name of the Rockford, Ill., Motor Car Dealers' Association has been changed to that of the Rockford Automobile Trade Association, in order to conform to that of the national organization, which was also changed recently. The old name implied that only automobile dealers could join. Accessory dealers and others handling parts pertaining to motor vehicles are eligible. It is believed that as a result of the new cognomen, there will be a large increase in the membership.

**Protected from Mexican Bandits**—Mexican bandits roaming the province of Sonora on horseback will have to improve their means of transportation before they make any further demands upon R. L. Budrow, general manager of the El Tigro Mining Co., Sonora. Duty having compelled him to remain at his post despite the danger of contact with bandits, Mr. Budrow purchased a White 45-horsepower touring car equipped with a set of flange wheels which can be quickly attached to the car and permit a hurried flight to the American border on railroad rails.

**May Bar Red Tail Lights**—Third reading has been given by the legislative assembly at Quebec, Que., the Mitchell bill regarding rear lights on motor cars. The bill does not bring into effect the former provisions of the motor vehicle act eliminating rear red lights, but leaves it to the lieutenant-governor-in-council to forbid, at any time, any motor vehicle to carry a red light, and enact that the carrying of such light shall be an offense against the law from and after the date of the publishing of the order-in-council to that effect. Mr. Mitchell informed the house that he was not yet convinced that red end lights constituted a danger, as was claimed by the railways, but that representation from the engineers was to that effect, and the bill would enable the government to act when necessary.

**New Color Routes in Canada**—Thirteen color routes have been marked for motorists in western Canada, according to the announcement made by President F. G. Crawford, at the annual meeting of the Manitoba Motor league, held last week at Winnipeg, Man. The great strides made by the league in this direction is seen in the fact that at the close of 1915 only six color routes had been laid and marked. A number of them have been carried to points in Saskatchewan such as Regina, Oxbow and Arcole, with the idea it was explained of prevailing upon the Saskatchewan Motor League to continue the work in that province. The officers elected by the association were as follows: Hon. President, Wm. Schwartz, Brandon; president, F. G. Crawford; vice-presidents, D. Lamont, Melita; W. G. Brown, Minedosa and Mayor Casselman, Emerson.

## Coming Motor Events

### SHOWS

- March 15-18—Trenton, N. J., show.
- April 3-8—Twin Falls, Idaho, show.
- March 21-25—Deadwood, S. D., show.
- March 22-25—Saginaw, Mich., show.
- March 28-31—Saginaw, Mich., show.
- April 1-8—Butte, Mont., show.
- April 10-15—Seattle, Wash., show.
- April 12-15—Calumet, Mich., show.

### CONTESTS

- March 19—Los Angeles, Cal., speedway race.
- April 8—Corona, Cal., boulevard race.
- May 6—Sioux City, Ia., speedway race.
- May 13—New York, Sheepshead Bay speedway race.
- \*May 20—Chicago speedway amateur's race.
- \*May 30—Indianapolis speedway race.
- May 30—Tacoma, Wash., speedway race.
- May 30—Minneapolis, Minn., speedway race.
- \*June 10—Chicago speedway race.
- June 28—Des Moines, Ia., speedway race.
- July 4—Minneapolis speedway race.
- July 4—Sioux City speedway race.
- July 4—Track meet, Couer d'Alene, Ida.
- July 15—Omaha, Neb., speedway race.
- July 15—Track meet, North Yakima, Wash.
- August 11-12—Hillclimb, Pike's Peak, Colo.
- August 5—Tacoma speedway race.
- August 18-19—Elgin road race.
- September 4—Indianapolis speedway race.
- September 4—Des Moines, Ia., speedway race.
- September 4-5—Track meet, Spokane, Wash.
- September 16—Speedway race, Providence, R. I.
- September 29—Track meet, Trenton, N. J.
- September 30—New York, Sheepshead Bay speedway race.
- October 7—Omaha speedway race.
- October 14—Chicago speedway race.
- October 19—Indianapolis speedway race.

\* Sanctioned by A. A. A.



## Good Roads Activities

**Ohio Distributes Road Funds**—Approximately \$2,600,000 will be distributed by the state of Ohio to the various counties this year for good road purposes, so State Highway Commissioner Clinton Cowen has announced. Half of the money will be available in March and the remainder some time in August. This money will be for main market roads, for inter-county roads and for maintenance of these roads.

**Plan Kansas City-Topeka Road**—Three hundred road boosters met at Lawrence, Kas., recently to plan ways and means of improving and macadamizing the 65-mile stretch of road between Kansas City and Topeka, the capital of Kansas. They organized under the name of the Kaw Valley Improved Highway Association. H. S. Putney, Topeka, was elected president. Vice-presidents were chosen to represent each city on the route.

**Ohio Regulates State Appropriations**—State funds for the construction of main market roads cannot be turned over by the state highway commissioner to counties to be expended by the county commissioners, it was held by Attorney-General Turner in a ruling to Highway Commissioner Clinton Cowen. The question came up from Ashtabula county. Funds from the state for inter-county road improvements may be turned over only under certain definite provisions of the law, he said.

**License Fees Swell Oregon Fund**—Motor car figures in the state of Oregon are changing rapidly. At the close of February 12,878 owners had received their yellow tags, while 19,046 Oregon owners had received their red tags. Multnomah county leads all others in the state with upwards of 9,000 cars. A valuation of from \$250 to \$400 a car makes a gross assessment valuation of motor cars of \$3,000,000. This will yield a revenue of nearly \$100,000 which will find its way into the road fund.

**Government Funds Not for Roads**—No federal appropriation is to be made for the repair of the Roosevelt dam highway, now known as the Apache trail. The house committee on appropriations takes the view that for the government to aid in maintaining this highway would be to set a dangerous precedent. After the January floods Carl Hayden, congressman from Arizona, introduced a bill appropriating \$20,000 for the repair of the Roosevelt road. The bill was referred to the appropriations committee who reported against it.

**Milwaukee County O. K.'s Contracts**—Contracts for 11 miles of concrete paving, or about one-third of the concrete highways to be constructed in Milwaukee county, Wis., in 1916, have been awarded at \$99,517, or approximately \$9,000 per mile. The bids for paving alone ranged from 66 to 74 cents per square yard; the grading from 40 to 49 cents per cubic yard. The county provides the cement and reinforcing metal, as well as the water supplies, and the average of \$9,000 per mile is practically the cost of the labor.

**Indians Block Road Support**—Because the Indians of the Umatilla reservation in Oregon seek to block a move to place the Mission-McKay road under the jurisdiction of the county court, the matter will be taken up with the bureau of Indian affairs. The road, about 20 miles in length, has been in use for many years but has never been turned over to the county, which refuses to spend money on roads not in its jurisdiction. The consent of all the Indians along the road has been secured for the transfer, but the tribe as a whole refused to sanction it. The objections of the Indians are that they are amply able to take care of their own

roads, and that the county has not spent much on reservation roads already under its jurisdiction.

**Old Trails President Resigns**—Judge J. M. Lowe, who has been president of the National Old Trails Road Association for the last five years, announces that the national headquarters of the road in the Midland building, Kansas City, Mo., will be closed April 1 and that he would resign from his office at once. Lack of financial support for the road is the cause.

**To Extend Midland Trail**—The Midland trail, a highway to extend from San Francisco to Washington, D. C., is the latest piece of modern roadway to cross the continent, and Kentucky will be traversed by this new highway. Officials of the executive Committee named by the promoters have circulated a communication, with a map, showing the states, cities and towns that will be traversed by the new road. Leaving San Francisco, it will come to Salt Lake City, thence to Denver, Pueblo, Kansas City, St. Louis, Louisville, Lexington, Winchester, Ashland, Huntington, Charleston, Richmond and on to Washington. The distance is 2,930 miles. From St. Louis to Louisville it will run via Vincennes and cross the river at New Albany.



**ROAD SIGNS IN PENNSYLVANIA**—An example of what can be done on highways for the convenience of motorists was demonstrated recently in a small campaign which was started to raise funds for 50 sign-posts to replace the unsightly ones scattered along the roads in Delaware county, Pa. The signs were to be a durability that would last from "40 years to forever." For this purpose a small amount was subscribed by the borough of Media, about 25 subscriptions of \$5 and \$10 each from local residents and \$25 from the Automobile Club of Delaware county. In all \$400 was raised. The accompanying illustration shows the type of post which was erected. The boards are locust wood. These have metal letters nailed on, of a kind that cannot be pulled off and will not rust. They are colored to contrast with the boards. The posts on which the signs are placed are of 2-inch pipe and about 11 feet long. They are planted about 3 feet in the ground. With careful planning a good outfit was secured, the total cost of which was slightly over \$8 per post.

## With the Motor Clubs

**Mobile Club in Membership Campaign**—The Automobile Club of Mobile, Ala., has launched a campaign to secure 1,000 members. Four teams of fourteen members each are to enlist the new members. Herbert Lyons is chairman of the campaign committee.

**Keokuk, Ia., Has Club**—A club has been organized at Keokuk, Ia., with thirty-five charter members. It will have for its chief activity the marking of the roads leading into Keokuk, particularly the road to Burlington and the road to Quincy, over both of which there is a heavy travel.

**Club Will Bulletin Roads**—Bulletin service on all roads throughout the state is part of the plan of greater activity on the part of the Portland Automobile Club, Portland, Ore., during the season of 1916. In this way they hope to encourage touring throughout the state. The club will also publish a 1916 tour book.

**Club Will Mark Roads**—If a state can be given a color on a map, the Montgomery Automobile Club, Montgomery, Ala., believes that a road can be given a color that will enable tourists to keep in the right direction. The colors will be applied to telegraph poles along the way, provided the Western Union grants permission. All the roads to important points nearby will be designated.

**Fond du Lac, Wis., Has Club**—A motor club is being organized at Fond du Lac, Wis., and a charter membership of seventy-five is assured. Motorists of Fond du Lac have not been organized before, although the city is one of the largest in Wisconsin and has a large tourist business. The membership committee consists of J. P. McDermott, C. M. Dyckhoff and F. M. Givens. Club quarters will be provided.

**Club Gets Show Receipts**—After paying all expenses, the McLean County Automobile Club has a balance of \$900 as a result of the recent show in Bloomington, Ill. The dealers donated the rebate as usual in order to give the club a fund to promote good roads, a plan which is meeting with much favor among the dealers of Illinois. It has been decided to utilize a portion of the fund to promote a campaign of publicity in order to demonstrate to the taxpayers that the interest on a bond issue of \$1,000,000 or \$2,000,000 for the construction of permanent roads would be no greater than the sum annually wasted in the effort to maintain dirt roads. This campaign will be pushed during the present year, and, at its conclusion, the proposition will be submitted to the voters. The McLean county club secured 100 members during the recent show, bringing the total up to 400.

**Club Re-elects Officers**—The Automobile Club of Southern California has selected its officers for the coming year. All of the men who held office last year were unanimously re-elected. The president is Fred L. Baker, who has served in that capacity for several years, and under whose direction the club has engaged in some of its most important undertakings. Standish L. Mitchell is secretary, and Ralph Reynolds, manager of the inter-insurance exchange of the club, has been elected to hold the recently created position of assistant-secretary. The other officers are: Vice-president, W. L. Valentine; second vice-president, H. G. Miller; directors, A. C. Balch, H. W. Keller, W. H. Booth, E. G. Kuster, E. T. Off, Harry Chandler, Fred L. Baker, W. L. Valentine, and H. G. Miller. This year the club plans to erect hundreds of new guide posts and signs throughout the southern part of the State, and hopes to increase its membership materially.



# Among the Makers and Dealers



## SHIP TRUCKS TO PACIFIC COAST BY SPECIAL TRAIN—

For the first time in the motor truck industry, a solid train shipment of high-grade motor trucks, intended exclusively for commercial service, was dispatched March 1 from Cleveland, O., to the Pacific coast. This special train, composed of twenty-one freight cars, containing fifty-four trucks, was sent out by the White Co. The size of this shipment is second only to the trainload shipments of motor trucks for export purposes which

have been sent to Atlantic coast ports. All of the trucks on this train, ranging from 1,500 pounds to 5 tons, have been purchased by business firms. When the train reaches its destination at San Francisco, some of the trucks will be unloaded and delivered to the purchasers, while the others will continue in transit to Los Angeles, Portland, Seattle, Tacoma and other coast points. The coast is growing rapidly as a market for commercial vehicles as well as passenger cars.

**Dort Co. Increases Price**—The Dort Motor Car Co. has raised the price of its touring car \$15 from \$650 to \$665.

**Little to Bearings Co. of America**—William C. Little has become western representative of the Bearings Co. of America, with headquarters at Detroit, Mich.

**J. C. Morehouse with Lozier Co.**—J. C. Morehouse, who during the last two years was a traveling representative of the Maxwell Motor Co., has been appointed sales manager of the H. A. Lozier Co., which makes the H. A. L. twelve.

**P. S. Stubbs with Premier**—The Premier Motor Corp. announces that P. S. Stubbs has accepted the position of director of sales of the Premier. Few men in the motor industry have had any wider experience in the selling field than Stubbs.

**New Lane Truck Ready**—M. H. Lane has been elected president and general manager of the Lane Motor Truck Co., recently organized at Kalamazoo, Mich. George E. Bardeen, Jr., is secretary-treasurer. The first model is expected to be out this week. It will be of the worm-drive type.

**Motor Age Ad Brings Norway Visitor**—Victor Lindzen of Lindzen & Robsahm, Christiana, Norway, has been in this country and has closed for the Marmon agency for Norway. His concern also represents the Hupmobile and Denby truck. Mr. Lindzen's business trip was a direct result of the advertisements of the Marmon recently appearing in Motor Age.

**Champion Increases Output**—The Champion Spark Plug Co., Toledo, O., will increase its output from 45,000 to 100,000 spark plugs per day as soon as a new 6-story addition to its present quarters at Toledo, O., is finished. Work will be started on the new building during March. The company will also build another story to the 4-story addition which was built 2 years ago. When these additions are completed, it will have 60,000 square feet more of space.

**Capacity Business in Lamps**—The business of the C. M. Hall Lamp Co., Detroit, Mich., shows an increase for January and February of 65 to 70 per cent over these two months in 1915. The plant is being operated to full capacity, 230 men being on the over-time pay-roll four days per week. They work 14 hours. The company now has in excess of \$1,000,000 worth of gross business on its books, which will keep their factory busy till 1917. They are well provided with all the needed materials. The capital stock

of the company was recently raised from \$150,000 to \$300,000 and has been placed on a 2½ per cent monthly dividend basis.

**Walker Company Moves to Cleveland**—The H. J. Walker Co., Cleveland, O., which does much of the Chandler Motor Car Co.'s machining, has moved its equipment from Detroit to a large building on the latter's grounds. The Briggs Mfg. Co., Detroit, has opened a plant on a site adjoining the Chandler factory, where the painting and upholstering work of the entire output of Chandler cars will be done.

**Chalmers' Largest Shipments**—Chalmers cars having a value of \$3,000,000 were shipped from Detroit, Mich., during February, according to an announcement made by the Chalmers Motor Co. The biggest day of the month—also the biggest in the history of the company—was February 29, when 193 cars were shipped. Orders which had to be carried over, although they should have been shipped last month, totaled 1,747. There are 4,148 car orders on hand for delivery in March, which makes a

total of 5,895, including those carried over. Indications point towards a continuation of the record breaking business.

**Rippingille Moves Up**—The Hudson Motor Car Co., Detroit, Mich., has promoted E. V. Rippingille assistant sales manager in charge of service. Mr. Rippingille has been with the company since it was started.

**Paige Increase in February**—February showed an extraordinary increase of business for the Paige-Detroit Motor Car Co., Detroit, Mich., over the total business for the same month last year. To be exact, the increase in the number of cars built and delivered was 117 per cent for that single month over the February, 1915, record.

**Duffield to Mechanical Rubber**—J. E. Duffield, who for many years has been a prominent figure in motor car circles, is identified with the interests of the U. S. Rubber Co., as sales manager for the Mechanical Rubber Co., Chicago. The Mechanical Rubber Co., of which D. C. Blanchard is manager, will add several new lines to its already complete one of motor car rubber goods, and Mr. Duffield will promote their sale under the trade mark of "Usco."

**New S-B Dealer at Cleveland**—The Luxurious Light Car Co. has opened quarters in Cleveland, O., to handle the Scripps-Booth car. J. M. Smith, who had charge of the manufacture of the Cole factory in 1912 and the Henderson in 1913 and part of 1914, is the president of the company, while J. Breston Penfield is the secretary and treasurer. Mr. Penfield has represented the Scripps-Booth car in central Ohio for the last 18 months. The company will distribute this year in twenty counties in northern Ohio.

**New Heat-Treating Plant**—The Timken-Detroit Axle Co. at Detroit, Mich., is now building a large addition which will be the seventh new building put up within the last year. The new structure will be known as the heat-treating plant and will cost approximately \$300,000. It will be a three-story building 40 feet by 330 feet. The heat-treating department will occupy the entire first floor while the upper floors will be two specially built rotary furnaces, embodying in their design all the new scientific principles required for the heat-treatment of the many grades of steel used by the Timken company. The plant will be connected with the large new forge shop, recently completed, by a tunnel which runs under the main building of the Timken plant. Through this tunnel forgings will

## The Show Circuit



**Twin Falls, Idaho, Show**—Because of the fact that the tabernacle in which the Twin Falls Show, Twin Falls, Idaho, is to be held will not be available as soon as was expected, it has been found necessary to change the date for the show from March 20-25 to April 3-8.

**Has Movie Motor Show**—Durant, Ia., had a novel show last week when H. F. Bierkamp rented the opera house and invited the residents to the town's first motor show. It was a movie show. Pictures taken in the Ford and Overland factories were thrown on the screen.

**Danville, Ill., Show**—Finding it impossible to secure a building adequate in size, the dealers of Danville, Ill., who planned a display of cars about the middle of March, are likely to postpone the show until April, when a tent can be secured which will be sufficiently large to accommodate all of the entries. Already entries aggregating sixty cars have been received, and it is expected that 100 will be entered later.



be brought through a tunnel from the forge shop to the heat-treating furnaces by electrical industrial trucks.

**Oklahoma Companies Join**—The Western Auto Sales Co., Tulsa, Okla., has absorbed the Segar Auto Supply Co., making it one of the largest accessory houses in Oklahoma.

**L. E. Crowe with Paterson**—L. E. Crowe, well known in southern California motor car circles, has been appointed southern California and Arizona distributor of the Paterson line.

**Smaller Owens Under Way**—Good progress is being made with the smaller of the Owen magnetic cars in the Baker plant of the Baker R. & L. Co., Cleveland, O. Of course there were many things to be done before the various parts of the car could actually take their proper course through the factory and this caused some delay. However, it is expected now that deliveries will begin early in May. Deliveries of the larger car, made in the New York factory, now are being made.

**Kaufman Die and Tool Sales Manager**—J. Douglass Kaufman, who for the past several years has been sales representative for the American Die and Tool Co., previous to taking position as manager of the Service Gear and Machine Co., has been appointed sales manager of the American Die and Tool Co., Reading, Pa. This branch of the business was formerly handled by the manager of this company. Mr. Kaufman also remains as manager of the Service Gear and Machine Co., incorporated for the manufacture of repair parts for obsolete and orphan cars.

**Bowser Engages C. D. Wheeler**—C. D. Wheeler Philadelphia, Pa., is to be advertising manager of S. F. Bowser & Co., tank and pump manufacturers, Fort Wayne, Ind., to succeed George A. Townsend, who resigned a short time ago. Mr. Wheeler for a number of years was advertising manager of the Fort Wayne Electric Works. Later he accepted a responsible position with the Santo Vacuum Cleaner Co., Philadelphia, where he has since resided. S. F. Bowser & Co. is enjoying the heaviest business and is working the largest factory force in its history. Even at the high pressure at which the works are being operated they

are not able to keep abreast of the orders, which are pouring in as they never did before.

**Dividend by Storage Battery Co.**—The Electric Storage Battery Co., New York, has declared a dividend of 1 per cent from net earnings of company, on common and preferred stock, payable April 1 to stock of record on March 21.

**Kennington to England**—W. C. Kennington, for the last 5 years assistant chief engineer of the Remy Electric Co., will leave with his family for England the fore part of April. Mr. Kennington is offering his services to the war office but as yet has not been assigned to any definite post.

**Velle Output Multiplies**—The Velle Motor Vehicle Co., Moline, Ill., reports that deliveries are averaging 400 per cent greater than one year ago. The company last week sent out a shipment valued at \$96,000, the largest single shipment of pleasure cars ever made from this center, Moline. They were consigned to J. W. Bowman Co., Boston, Mass.

**Saxon Shipments Increase**—Shipments of Saxon cars during the last month increased more than 150 per cent as compared with February, 1915. Last year 844 cars were shipped, whereas this year 2,231 were shipped. In January of this year 1,556 Saxon cars were shipped by the Saxon Motor Car Corp., as compared with 850 in 1915. The increase for the first 2 months of 1916 is 2,237, or 144 per cent, over the shipments of the 2 first months of 1915.

**Growth of the Hudson Car Rapid**—The year 1915 was the biggest year of extension in the history of the Hudson Motor Car Co., a total of 328,490 square feet of floor space being added to the already large plant in Detroit, Mich., which now has a total of 813,882 square feet of floor space. The original buildings occupied 172,282 square feet in 1910, which means that the present size is nearly five times what it was only 5 years ago. During 1911 the area was increased by 72,422 square feet of new constructions; in 1912 the additions totaled 82,744 square feet; in 1913 only 53,370 square feet, but in 1914 nearly twice that much, or 104,574 square feet, were added. It was in 1915 that the biggest additions were

made, and it is said that even these are not sufficient for the increasing activities of the company.

**Makes Bodies for Others**—The Anderson Motor Co., Rock Hill, S. C., is building bodies for other makers in connection with the bodies made for its own cars, the Anderson Six-46.

**Will Make Electrics**—The Belmont Electric Automobile Co., Wyandotte, Mich., recently has taken over the Murphy Machine Shop and is to start making passenger and commercial electrics.

**McClure Goes to Dallas**—M. W. McClure, formerly factory representative in Texas for the Marion company, and recently with the Texas Harvester Co., has accepted a position with the Rose Fosdick Automobile Co., Dallas, Tex.

**Cleveland-Overland Building**—The Overland-Cleveland Co. has taken over the 99-year lease on the buildings and grounds it occupies in Cleveland. It has been decided to extend the building and make it three stories high. A service station also will be built.

**Kramm Sells Pioneer Brass Interest**—H. D. Kramm has sold his interest in the Pioneer Brass Works, Indianapolis, Ind., and is incorporating a company for the manufacture of maluminum, malleable aluminum, and aluminum castings and finished pistons. The Pioneer Brass Works will continue to make Maluminum castings under a royalty. Mr. Kramm for the present will maintain his offices at 917 Fletcher Trust Bldg. until plant and equipment are complete.

**Maus Joins Fisk Staff**—J. B. Maus, for the last 2 years eastern district manager of the Batavia Rubber Co., has joined the Fisk Rubber Co., of New York, where he will have charge of the export department at the general offices in Chicopee Falls, Mass. Mr. Maus has been in the tire business for 10 years, his first connection being with the Goodyear Tire and Rubber Co., as special factory representative. Following this he became New York district manager for that concern. Four years ago he joined the United States Tire Co., remaining with that company until he joined the Batavia concern in 1914.

**Akron, O.**—Amazon Tire & Rubber Co.; capital stock, \$100,000; incorporators, L. J. Schett, L. F. Smith, C. E. Bettler, E. H. Cline-dinst and F. B. Burch.

**Akron, O.**—Amazon Tire & Rubber Co.; capital stock, \$100,000; incorporators, L. J. Schott, L. F. Smith, C. E. Bettler, E. H. Cline-dinst and F. Burch.

**Birmingham, Ala.**—Alabama Auto Supply Co.; capital stock, \$5,000; incorporators, J. C. Lillich, E. M. Vice and J. Morrison.

**Baltimore, Md.**—Baltimore Rubber Tire Mfg. Co., to manufacture tires; capital stock, \$200,000.

**Brillion, Wis.**—Calumet Automobile Co.; capital stock, \$20,000; incorporators, E. H. Kloehn, O. R. Kloehn, F. Tikalasky, M. Decker.

**Brillion, Wis.**—Calumet Automobile Co., to deal in motor cars, tractors, etc.; capital stock, \$20,000; incorporators, E. H. Kloehn, O. R. Kloehn, F. Tikalasky and M. Becker.

**Chicago**—Marvel Steel Products Co., to manufacture and deal in motor cars and motor vehicles; capital stock, \$25,000; incorporators, J. C. Bulger, T. F. Ehler and G. G. Ramsey.

**Chicago**—Rex Pump Co., to manufacture and deal in motor car pumps; capital stock, \$10,000; incorporators, Robert Elson, A. Z. Zeitlein and Hyman Soboroff.

**Cleveland, O.**—Central Wagon and Auto Co.; capital stock, \$75,000; incorporators, H. D. Squires, G. E. Bradbury, C. E. Mellon, H. A. Beckett and L. C. Splith.

**Detroit, Mich.**—Motor Heater Corp.; capital stock, \$30,000; incorporators, J. C. Dysory, W. Ganea and S. J. Lukaszewski.

**Detroit, Mich.**—United Starter Co.; capital stock, \$1,000; incorporators, H. H. Armstrong, Arthur P. Hicks and James W. Martin.

**Detroit, Mich.**—Laehm Body Co., to make motor car bodies; capital stock, \$10,000; incorporators, W. H. Laehm, A. A. Schueren, A. H. Roehm and J. L. Meyer.

**Danville, Ill.**—Auburn Auto Co., to sell and repair motor cars; capital stock, \$10,000; incorporators, E. R. Barkman, J. M. Barkman and H. H. Cast.

**Detroit, Mich.**—Castaluminum Body Co., to manufacture aluminum motor car bodies; capital stock, \$100,000; incorporators, Robert F. Dyer, W. A. Watts.

## Recent Incorporations

**Detroit, Mich.**—Decker Auto Top Co., motor car tops, general trimming and painting; capital stock, \$15,000; incorporators, W. J. Decker, I. O. Decker, P. A. Gormican.

**Dover, O.**—Garage on the Square Co.; capital stock, \$35,000; incorporators, Ed. H. Zoller, F. P. Potschner, W. V. Zoller, C. Maurer and Karl Potschner.

**Eau Claire, Wis.**—Eau Claire Mfg. Co., to manufacture motor plows, gas tractors, etc.; capital stock, \$75,000; incorporators, M. S. Op-sata, G. R. Wood and R. B. Gillette.

**Fronton, O.**—Jenkins Garage Co.; capital stock, \$5,000; incorporators, Thomas Russell, Claude Whitney, Arthur Jenkins, Nick McMahon and F. F. Phillips.

**Kalamazoo, Mich.**—States Motor Mfg. Co.; capital stock, \$600,000.

**Los Angeles, Cal.**—Auto Inn Garage Co.; capital stock, \$300; incorporators, James R. Slack, A. W. Layne, Mary S. Layne, Glen Sachse.

**Los Angeles, Cal.**—Miller Carburetor Sales Corp.; capital stock, \$10,000; incorporators, E. S. Harlan, H. K. Wheeler, W. A. Spanton, F. C. Goodnow.

**Los Angeles, Cal.**—Chevrolet Sales Co.; capital stock, \$50,000; incorporators, S. F. Seager, Earl A. Maginnis, M. E. Plasterer.

**London, Ont.**—Beemer & Co., motor dealers; capital stock, \$25,000.

**Montreal, P. Q.**—Overland Tire & Rubber Co.; capital stock, \$50,000; incorporators, J. J. O'Reilly, W. H. Wickham and N. F. MacNeill.

**Malden, Mass.**—Slocomb Motor Co.; capital stock, \$25,000.

**Marietta, O.**—Bix-Six Oil Co., to deal in oil and gasoline; capital stock, \$10,000; incorporators, W. J. Dutton, E. C. Robinson, C. R. Williamson, W. D. Bearchley, W. H. Lorentz, C. E. Dickinson and C. G. Robinson.

**Newark, N. J.**—United Motor Car & Supply Co., general motor car business; capital stock, \$25,000.

**Newark, N. J.**—Acme Garage; capital stock, \$125,000.

**New York**—Dumb Motor Truck Co., to manufacture and sell motor trucks and motors of all kinds; capital stock, \$200,000.

**New York**—Bethlehem Motor Truck Corp., to manufacture motor vehicles of all kinds; capital stock, \$3,000,000.

**New York**—Fergus Motors of America, to manufacture motors, engines, machinery, etc.; capital stock, \$2,000,000; incorporators, C. T. Rowe, C. Flandy, Jr., C. E. Quantrell.

**Portland, Me.**—Puritan Motor Sales Co., to manufacture and deal in all kinds of motors, vehicles, etc.; capital stock, \$25,000.

**Portsmouth, O.**—Independent Taxicab Co.; capital stock, \$10,000; incorporators, J. E. Frostick, D. J. Miller, F. A. Frostick, H. G. Steagall and Earl Henry.

**Rochester, N. Y.**—Sullivan Motor Truck Corp., to deal in motors, cars, devices for propelling, etc.; capital stock, \$40,000; incorporators, D. E. Sullivan, J. O. Comerford, A. M. Sullivan.

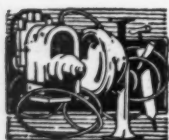
**Rochester, N. Y.**—Armour Tread Co., to manufacture armor treads for motor cars and tires, leather and wool goods, etc.; capital stock, \$60,000; incorporators, J. H. Thomas, J. W. Haller, S. Humphrey.

**Racine, Wis.**—M. I. McAvoy Co., to manufacture and deal in seat covers, tops and other motor car accessories and trimmings; capital stock, \$25,000; incorporators, M. I. McAvoy, Alice McAvoy and James Murphy.

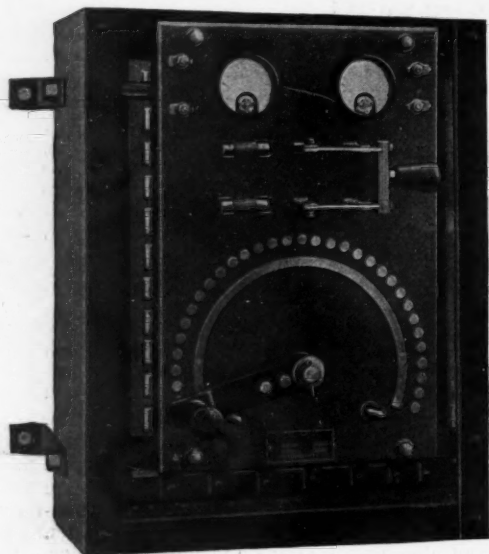
**South Paris, Me.**—Norway Auto Co.; capital stock, \$10,000.

**Toledo, O.**—Toledo Motor Sales Co.; capital stock, \$10,000; incorporators, J. H. Clause, F. E. Northrup, G. P. Hahn, T. Wooster and V. C. Southard.

**Toledo, O.**—Parker Automobile Co.; capital stock, \$15,000; incorporators, R. A. Parker, F. W. Bartling, Willie Wheaton, N. M. Turner and C. F. Watts.



# The Accessory Corner



Cutler-Hammer charging rheostat for larger garage work

## Cutler-Hammer Charging Equipment

THE line of charging apparatus for use with batteries on starting, lighting and ignition systems has recently been augmented by the addition of two new types of rheostat such as are shown in the two illustrations on this page, the larger one being made particularly for charging a number of batteries in series.

The smaller one is intended for mounting on a wall or switchboard and consists of several resistance units enclosed in a sheet iron case. On the slate panel there are several contact buttons with a convenient operating lever and the two binding posts at the top for connecting to the batteries. For this small type designated by the manufacturer, the Cutler-Hammer Mfg. Co., Milwaukee, Wis., as "G" two sizes are made for connection to 115-volt direct current circuits. The boxed weights are given as 16 and 24 pounds respectively, and the maximum and minimum charging rates are given as 5 and 2.5 and 10 and 5 amperes based on charging the usual three cells of a 6-volt system in series.

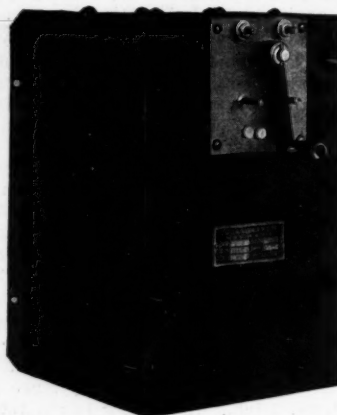
The larger is well suited for a garage where it is desirable and economical to charge a number of motor car batteries in series. They may be used to charge any number of cells up to forty-four lead or sixty Edison on a 115-volt circuit, or up to eighty-eight lead or 120 Edison cells on a 230-volt circuit.

The apparatus consists of a sheet metal frame arranged for wall mounting, containing the resistance and carrying a slate panel on which is mounted a movable arm with suitable contacts. Thirty steps of adjustment are provided. When required, a double pole main line knife switch, an ammeter, and a voltmeter can be furnished mounted on the panel as shown in the

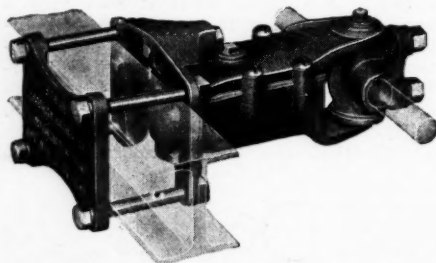
illustration. The ammeter is permanently connected in series with the rheostat, and indicates the charging current at all times. The voltmeter has a 15-volt scale and is intended to be used with flexible leads so that the voltage of the separate batteries can be easily obtained.

## Shaft-Driven Valve

R. T. Guyer, Elkhart, Ind., has invented a valve, which, it is said, is superior to the so-called poppet valves now in common use on motor cars and other kind of engines.



Cutler-Hammer charging rheostat for private electric garage use



Savidge steering device

It is especially adapted for four-cycle engines. Advantages claimed for the new valve are that it is shaft-driven through spiral gears. Mechanical noise is eliminated because of the absence of cams, cam gears, push rods, rocker arms and all small parts necessary to the poppet valve construction. The inventor claims that the valve is almost as simple in construction as those used on the two-cycle type.

## Ever-Ready Carbon Remover

The Ever-Ready Mfg. Co., St. Louis, Mo., is marketing a carbon remover and engine cleaner, a \$2.50 can of which is guaranteed to contain enough to clean the carbon from a four-cylinder gasoline engine three times. It is said to contain no acid and not to injure any part of the motor. It is sold on a money back if not satisfied guarantee. This company also makes a metal polish for cleaning brass, copper, nickel, aluminum, steel and other

metals. This also is sold on a guarantee of satisfaction at 35 cents a can.

## Savidge Steering Device

The Meixell Co., Indianapolis, Ind., is marketing an improved Savidge steering device for Ford cars, which is shown on this page. The interior construction, formerly open to the weather, has been inclosed and the device now operates in an oil bath, thus making it less likely to wear. The purpose of the device is to keep the front wheel in a straight-ahead position when not turned at an angle by the driver of the car. The device sells for \$4.90.

## Air Break for Fords

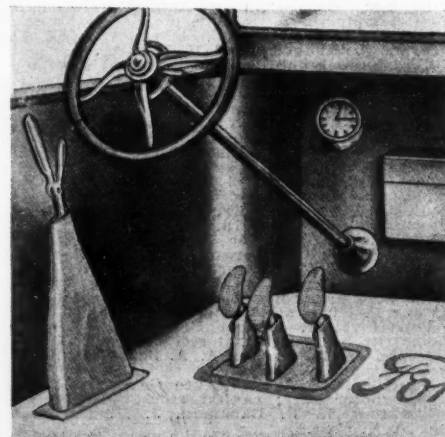
The Franklin Rubber Co., Boston, Mass., has brought out coverings known as air breaks for use on Ford cars to keep the heat from the engine in summer and the cold from the outside in winter, coming into the driver's compartment through the rather large openings around the control pedals and the brake lever. These are shown in an illustration at the bottom of this page and may be had at \$1, complete set of four boots.

## Eclel Steering Device

The Eclel Tire & Rubber Co., Columbus, O., is manufacturing and marketing a steering device which retails for \$6 and keeps the car under control at all times. It is calculated to remove all shock from the steering wheel and to make the light car as easy to drive as a heavy machine.

## Shaw Wrench Set

The Shaw wrench, which has jaws of the alligator type and a split shank which permits a slight spring and a tight grip of the jaws, is now put up in sets of two, one 4 inches and the other 6 inches. These two wrenches will take sizes from  $\frac{1}{8}$  inch to  $\frac{7}{8}$  inch and will grip round rods or anything the jaws will go over. It is made by the Shaw Propeller Co., Boston, Mass.; price, in imitation seal case, \$1; in pig-skin morocco case, \$1.25.



An air break for Ford cars